FINAL REPORT

COMPETITION AND REGULATION:

THE SELECTION AND COMPETITIVE EFFECTS

OF

HEALTH MAINTENANCE ORGANIZATIONS

HCFA Grant #8P-97556/901

Harold S. Luft, Ph.D.
Principal Investigator
Institute for Health Policy Studies
University of California, San Francisco

September 1983

Volume I

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INSTITUTE FOR
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SCHOOL OF MEDICINE • UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

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Chapter 1

Introduction and Overview*

This project was designed to address two major research and policy issues concerning Health Maintenance Organizations, or HMOs. The first question is how much of the difference in cost and medical care utilization observed for enrollees in HMOs and conventional insurance plans is attributable to the efficiencies of the HMO and how much is attributable to a disproportionate concentration of low utilizing people in HMOs? The second question is to what extent does the growth and development of HMOs cause a competitive response by conventional insurers and providers that results in lower utilization and costs for people not enrolled in HMOs.

The two questions have substantial bearing upon public policy. The lower costs of medical care for enrollees in HMOs relative to those in conventional plans is well documented in the research literature (Luft, 1981a). While the research supports the notion that costs are 10-40 percent lower for HMO enrollees, much of the public encouragement for HMO growth is based on the perception that HMOs reduce costs by 10-40 percent. In fact, it is possible that HMOs are no more efficient than conventional providers, but through various mechanisms they select or attract enrollees who are naturally less expensive than the average. If this were the case, and the entire observed difference were attributable to this selection effect, then the development and expansion of HMOs would have no net effect on total health care costs. (In fact, costs would rise to cover the startup expenses of the new plans.) If selection accounts for all the observed differences, then plans to provide vouchers for Medicare beneficiaries to join HMOs might increase federal costs if those joining

*by Harold S. Luft.

HMOs were actually 20 percent less costly than the average but received vouchers set at 5 percent below the average cost. On the other hand, if selection accounts for only a tiny fraction of the observed cost differences, then substantial savings might be realized throught the encouragement of HMOs.

Even the most enthusiastic HMO supporter recognizes that with HMOs enrolling only about four percent of the population by the end of the 1970's, it would be decades before even a majority of people were enrolled. However, the notion of a competitive impact of HMOs returned them to an important position in policy discussions. If a relatively small HMO market share, say 15-20 percent in a given locality, could lead conventional providers to change their practice patterns and become more cost-effective, then the growth of HMOs would have an impact far exceeding their direct enrollment. Furthermore, this cost containing effect would take place through the workings of the competitive market rather than through direct government regulation. In the changed political environment of the 1980's, this would be an attractive cost containing strategy.

Background for the Research Project

The proposal for this project was developed as the Principal Investigator neared the end of a multi-year comprehensive review and analysis of the literature on HMO performance (Luft, 1981a). One feature of that review was the determination of those aspects of HMO performance about which there was substantial and consistent evidence and those areas in which evidence was sparse or inconsistent. While it appeared fairly

certain that costs were lower for enrollees in the prepaid group practice type of HMO and rather certain that hospital use was lower than for enrollees in conventional plans, why such use was lower was much less clear. The uncertainty that surrounded the role of selection in explaining the observed differences in hospital utilization rates was demonstrated early in this project. Some existing data from people newly enrolled in HMOs in Rochester, N.Y. and Seattle were reexamined to test for a selection effect among such people. The results were sufficiently clear--people who were new enrollees in the PGPs were lower than average users while in the fee-for-service system--that the chapter on self-selection was substantially altered in the final draft (Luft, 1981a). However, case studies such as these merely demonstrate that the selection effect exists in certain circumstances and the nature of the cases (new enrollment options for specific groups) is likely to maximize the selection effect. Solid estimates of the overall magnitude of the selection effect were still lacking. If the average cost difference between HMO and non-HMO enrollees were 25 percent, does selection account for 1, 5, 20, or 24 percent of this?

The research base concerning the competitive effect of HMOs was similarly thin. Two cross-section regression studies had been done (Chiswick, 1976; Goldberg and Greenberg, 1977), both of which provided some support for a cost-containing competitive effect. Each study, however, had methodological weaknesses that reduced one's confidence in the findings. In particular, much of the empirical effect was dependent on a few observations from West Coast states with high HMO enrollments and low

hospital utilization rates. Unfortunately, the studies could not provide conclusive evidence on whether or not HMO growth caused lower utilization rates in general, low utilization rates encouraged HMO growth, or whether a third factor present on the West Coast led to both low hospital use and HMO growth.

At the same time it became apparent that not all competitive responses need be cost containing. Conventional providers might respond, at least initially, to the loss of patients to HMOs by increasing fees and services provided to the remaining patients. This would increase costs to those in the conventional system, and if some of those patients, such as Medicare and Medicaid beneficiaries, did not have the option of joining HMOs, then the cost increasing competitive response might be an important long term possibility. More importantly, market segmentation, cost containing and cost increasing responses might coexist, with substantial policy implications.

Those considerations led to the design of a complex, multi-part project. The major effort was to focus on a combined time-series cross-section model of hospital utilization of three population groups across all states and extending back to 1947, to predate the development of most HMOs. The time series data would allow greater confidence in assigning causality to competitive effects. The three population groups--Federal employees enrolled in the Blue Cross-Blue Shield plan, all Blue Cross enrollees, and all persons--would allow the estimation of the magnitudes of the selection effect, the "true HMO" effect, and the competitive effect. These

quantitative estimates would be supplemented by case studies of a few areas to provide a better sense of how the competitive impacts of HMOs were manifested.

Overview of the Project

A major midstream change in the project design was made in response both to data limitations and initial findings. The nature of the problems and the reason for the change are discussed in the next chapter, but a brief review will set the stage for an overview of the major products of the study. When the grant proposal was being developed, we recognized that the collection of cross-sectional data over a thirty-year time period would be a major undertaking and that various inconsistencies in the data sets would be discovered. Time was allocated to examine and "clean" the necessary data and to develop a clear understanding of certain variables. In two instances special reports were written: one placing the HMO in a continuum of medical care delivery systems which have evolved during the Twentieth Century (Chapter 8) and one comparing various estimates of the number of physicians in each state (Chapter 9).

The data problems encountered in this project were more serious because they relate to enrollment estimates in almost all health insurance plans, and in particular, to Federal and total enrollees in Blue Cross. Some errors in enrollment estimates were anticipated, but they were expected to be random. Instead, an examination of hospital utilization trends for Blue Cross enrollees and for all persons (derived from American Hospital Association and Census statistics) indicated a growing divergence

which appears related to growing duplication of insurance coverage (Chapter 10). Rather than there being random errors, the problem was clearly correlated with time and thus jeopardized the interpretation of the time series data. A second blow came with the realization that duplicate health insurance coverage also varied by state, and it, too, was not random, but was systematically related to some factors important in the proposed analysis (Chapter 11).

These findings concerning duplicate insurance coverage have important implications for other studies because many researchers have used both utilization rates computed from insurance carriers and estimates of coverage by state. To alert the health services research and policy community, two papers were published that focused on both the problems and their implications for research designs and policy (Luft, 1981b; Luft and Maerki, 1982).

The duplicate coverage "problem" meant that we could not have any confidence in an analysis of either set of Blue Cross data. The overall measure of hospital use from the American Hospital Association was still valid and could be used to provide an estimate of the net impact of the true HMO effect, the selection effect, and the competitive effects. However, by this time some preliminary results became available from case studies of Hawaii, Rochester, N.Y., and Minneapolis-St. Paul. These areas were chosen because others had indicated the presence of substantial cost containing competitive impacts, and it was thought that more careful analysis would help demonstrate how such effects occur. Quite surprisingly, in each area we found that the evidence for a cost containing

effect was either very weak or, if utilization rates had fallen, other explanations for the observed decline seemed at least as plausible as HMO competition.

Throughout the project, special attention was paid to the fact that the topic was of more than academic interest. The publication of some of the preliminary findings (Chapters 13-15) of the project received substantial interest from people in the policy arena, while at the same time at federal, state and local levels attention was focusing increasingly on competitive approaches to cost containment. Thus, as the potential findings became more important in terms of how they might influence policy, we became more concerned that the underlying research base be as solid as possible.

The usual research project, whether it be based on complex econometric models or simple case studies, usually tests whether factor A is related outcome B. Formal statistical tests can be used to determine whether one can reject the null hypothesis that A and B bear no relationship to each other. Most published research is able to reject the null hypothesis, but this does not mean that A causes B, although many who are not attuned to the nuances of research might assume this to be the case (Mayer, 1980). In fact, B might cause A, or some other factor, C, might be correlated with B, and C could cause A.

In the context of the current project, the initial work on the case studies suggested that in certain circumstances a cost or utilization reduction was correlated both with HMO development and other changes in the local medical care market. This implied that a focus on only the HMO's influence might result in the incorrect interpretation that the cost-

containing change is due to the HMO. In order to minimize the chance of an incorrect interpretation of causal linkages, we would have to be able to reject all the other potential causes before we could feel comfortable with suggesting the presence of a cost-containing competitive effect of HMOs. (This caution is not limited to HMOs; similar rigor should be applied to an evaluation of health planning, reimbursement systems, or other policy interventions.)

The three case studies on Hawaii, Rochester, New York, and Minneapolis-St. Paul are presented in Chapters 3, 4, and 5. Each is pursued in substantially more detail than was initially anticipated, largely because alternative explanations were the focus of attention rather than a more simple description of how an HMO affects the local medical care system. The case studies also raised important questions concerning the reliability and validity of some of the available data. The significance of these questions varies with the problems at hand, but in some cases they were sufficient to cast doubt over the interpretation of the results.

The lack of clear findings from the case studies posed a dilemma concerning the remaining time series cross section analysis of hospital utilization data. The case studies indicated substantial differences across areas and over time in the proportion of hospital days in short term hospitals (our proposed dependent variable) due to long term care patients. This immediately suggested a potential weakness which could not be eliminated in a convincing fashion through statistical manipulation. Furthermore, the three areas chosen for case studies were selected

precisely because large cost-containing competitive effects were anticipated. Not seeing effects in those areas made it less likely that significant findings would result from the large econometric model. Perhaps more importantly, if a significant coefficient concerning the impact of HMOs were found, its interpretation would be unclear because competing explanations could not be tested. Even though the discussion of those results would be replete with caveats concerning their interpretation, there is a reasonable chance that statistically significant but causally ambiguous findings would be used inappropriately in the ongoing policy debates.

While there were compelling reasons not to undertake the complete time series cross section model, it still seemed worthwhile at least to attempt a reevaluation of the two existing studies (Chiswick, 1976; Goldberg and Greenberg, 1977) that suggest a cost-containing competitive effect using single cross sections. The data used in our analysis (Chapter 6) are not directly comparable to the other studies because of differences in unit of observation and time, but we can offer a comparison between results for everyone in the market area and for those people without HMO coverage. The results provide a reconciliation of conflicting findings: there is a weak, negative HMO effect on total hospital use, but a positive and sometimes significant effect on use of non-HMO members. Given all the limitations in the data, the safest interpretation of these results is that the evidence for a cost-containing HMO competitive effect is at best weak and there may be a cost-increasing impact for non-HMO members, either through selection efects or cost-increasing competitive responses. Most

importantly, the data and available analyses are too weak to provide a reliable foundation for policies either strongly encouraging or strongly discouraging the development of HMOs for the purpose of containing costs among non-HMO enrollees.

The preceding discussion has taken a chronological approach to the research carried out as part of the project. This final report is organized in a somewhat different fashion. There are three major sections, the first of which describes the underlying model, how the project was modified over time, and the major empirical work. This section begins with Chapter II, entitled, "Metamorphosis of a Research Project." Chapters III, IV, and V present the case studies of Hawaii, Rochester, and Minneapolis-St. Paul, respectively, while Chapter VI presents the cross-section analysis of metropolitan areas. Chapter VII offers conclusions and policy implications both for HMOs and competitive strategies as well as suggestions for the role of research in policy discussions.

The second section of the report contains four chapters addressing particular problems and issues in the underlying data. Chapter 8 examines the changes over time in organizational structures of HMOs and related alternative delivery systems. Chapter 9 asks what appears to be a simple question, "How many physicians are there in a state?" and finds that the answer is not so clear. Chapters 10 and 11 explore the issue of duplicate health insurance coverage, examining first its impact over time and how not being able to account for duplicate enrollment biases hospital utilization figures from insurers, and, second, variations in duplication across states along with deriving synthetic estimates of coverage.

The third section contains a series of papers dealing with various aspects of the competitive and selection effects of HMOs and their impact on policy. Chapter 12, a hypothetical interview with a well-known but apocryphal cynic, suggests some of the potential risks in a policy relying upon competition among delivery systems. Chapters 13 and 14 are reprinted from the Prinicpal Investigator's book on HMOs. The first of these addresses self-selection and underwent major revisions at the last stage of writing based upon early results of this project. The second of the two outlines some of the organizational and environmental factors influencing HMO development and, contrariwise, how HMOs affect their environment--the competitive effect. Again, sections of this chapter drew heavily upon the early results of this project. Chapter 15 reprints a paper outlining the potential market effects of HMOs, indicating how the early evidence supports both cost-containing and cost-increasing effects, as well as no impact at all. Finally, Chapter 16 is a paper providing two snapshots of the project in process. The body of the paper was presented at a work-in-progress session at the American Public Health Association meetings in November 1979. By the time the paper went to press the project had changed further, so an epilogue was added to provide readers with a sense of the adaptive nature of the research process.

January 31, 1983

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Chapter 2

The Metamorphosis of an Empirical Research Project from Grant Proposal to Final Report*

Most health services research papers provide a rather straighforward discussion of the model to be tested, the data, methods used, findings, and implications of the results. While some research projects unfold according to schedule and are as simple as the final papers suggest, some projects present many more difficulties and challenges. Sometimes the difficulties reflect poor decisions on the part of the investigator, so a certain reticence is to be expected. Yet, a cursory reading of the literature might mislead a new investigator into believing that things should always go according to plan and that any deviations are attributable to researcher incompetence.

This is a final report of a moderately large research project that has undergone several major changes from its original design. While these changes may reflect investigator incompetence--this is left to the reader to decide--they may also help illustrate some important issues in the research process and be of more general interest. Thus, the current chapter focuses on the research process and pays little attention to the particular results of the project, which are available elsewhere.

When this research project began somewhat more than three years ago, it was designed to measure the selection and competitive effects of Health Maintenance Organizations. The primary focus of the project was a large econometric model of hospital utilization across all fifty states encompassing the period 1947 to 1976. Three sets of dependent variables would be used: overall hospital utilization as reported by the American

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Hospital Association, hospital utilization of Blue Cross enrollees, and hospital utilization of Federal employees enrolled in Blue Cross. This econometric modelling was to be supported by a series of case studies to document how the anticipated selection and competitive effects took place. The original proposal allocated less than 15 percent of professional time to the case studies. Yet, during the project we decided to abandon the large econometric model; thereafter our attention focused on the case studies and an investigation of why the available data were inappropriate for use in the econometric model. Because the data problems that we encountered may have an impact on other research projects, we thought it appropriate to explain them thoroughly.

A Summary of the Original Project Design

One of the ideas implicit in the HMO's economic incentives is the attempt to reduce the number of expensive services rendered and thereby realize financial savings for the plan and better coverage for the enrollee.* Thus, people who select HMOs or who chose to remain in them over time may well prefer less expensive medical care. To the extent that this occurs, the observed differences in medical utilization of HMO and non-HMO members are the result of a true HMO effect (that is, what the HMO does to alter practice patterns) and a self-selection effect. The larger the selection effect, the smaller the fraction of the observed difference

*While this section is drawn largely from the original grant proposal, many of the technical aspects of the proposal are deleted.

that is due to HMO incentives and the more illusory "savings" as measured by the differences in utilization between HMO and non-HMO enrollees. This may reduce their appeal for cost containment policy. For instance, the Seattle Model Cities Prepaid Health Plan Study indicated that the cost for enrollees in the Blue Cross/Blue Shield type plan was 50 percent more than for those in Group Health Cooperative. Adjusting for the higher pre-enrollment utilization patterns of the BC/BS enrollees, however, halves this differential to 25 percent (Luft, 1981a). Recent studies by Eggers and Prihoda (1982) demonstrate a selection effect among new Medicare enrollees in prepaid group practices that is only partly explained by age, sex, and disability status.

Just as one should not focus on HMOs without considering the potential biases resulting from self-selection, one must also not assume that the conventional system is passive with respect to HMO development (Luft, 1981b). The history of prepaid group practice plans is replete with instances of bitter opposition by organized medicine in what must be seen as a competitive response. Those legal battles were won by the prepaid groups in the late 1940s, but a much more subtle form of competitive response is likely to have taken its place. To the extent that HMOs can offer more complete coverage at comparable costs (either because of a true HMO effect or a self-selection effect), they will tend to expand at the expense of conventional health insurers such as Blue Cross and, indirectly, fee-for-service physicians. These insurers and providers might then try to respond to the HMO by controlling their own costs and thus retain their attractiveness to consumers. If our research led to the identification of

a strong competitive effect arising from even relatively small market penetration, then the savings directly attributable to HMO enrollees may be multiplied several-fold by the indirect effects on people in the conventional system. With true externalities of this type, the case would be very strong for widespread HMO development, even with relatively small market shares.

All such policy considerations are superimposed on a medical care delivery system that is substantially more geographically diverse than those of most other countries. For instance, in 1973 there were 1,426 days of care per 1000 population in the North Central region in contrast to 930 in the West (US NCHS, 1976). Even more striking is the nearly two-fold variation in days of care for Medicare beneficiaries--2,325 per 1000 in Utah versus 4,571 in South Dakota (Gornick, 1977). The above differences cannot be explained by age-sex differences nor is weather an important determinant. While the life-styles of the Mormon population in Utah may account for their low Medicare utilization rates, it is noteworthy that four of the next five lowest states are Washington, Oregon, California, and Hawaii, all with substantial HMO enrollments. But before one attributes too much to the competitive response explanation, one should also examine the roles of migration, hospital bed supply, long term care facilities, physician supply, and other factors. Many of these are subject to policy manipulation, and yet little is known about their roles in explaining geographic differences in utilizaiton. It should be noted, moreover, that these geographic differences are at least as large as those seen between HMOs and conventional plans and that current reimbursement policies make little effort to narrow them.

Given this underlying view of the medical care system and the role of HMOs within the context of the larger system, the project was designed to answer two major questions. The first was the relative importance of self-selection in explaining the observed differences in hospital utilization between enrollees in HMOs and in conventional plans. The second question was whether the development and growth of HMOs engenders a competitive response by conventional insurers and providers that results in a decline in hospital utilization. In particular, the project would attempt to measure both the magnitude of such a competitive response and provide examples of how such a response was implemented. Finally, as a by-product of the research design, the project would offer an explanation of the large differences in hospital utilization rates across the country and the changing patterns of use over time.

Rationale for the Combination of Case Study and Econometric Approaches

The selection and competition effects can be studied at various levels. Micro, or individual, studies involve data from a sample of people over time as they choose among and utilize the services of various health plans. Studies of this type include people in the Seattle Model Cities project (Richardson et al., 1976), employees of various firms in Rochester, N.Y. (Roghmann, Sorensen, and Wells, 1980; Berki et al., 1977, 1978), or Medicare beneficiaries (Egggers, 1980; Eggers and Prihoda, 1982). Another form of micro study involves detailed interviews and data collection among insurers and providers in an area to identify and document a competitive response to HMO development. This approach has been used in Minneapolis-

St. Paul (Christianson and McClure, 1978), Northern California and Hawaii (Goldberg and Greenberg, 1977), and Sacramento, San Diego and Santa Clara areas of California (Butler et al., 1981). Macro or aggregate studies use data on the hospital utilization of large population groups, holding various factors constant through statistical methods and, most importantly, drawing together historical data series to monitor over time the effects of the natural experiment of HMO development.

It is important to recognize that the alternative approaches are not completely interchangeable and that each has specific advantages and limitations. Micro studies are perhaps the best means of understanding how a phenomenon occurs and what subtle side effects result from an innovation. Findings from such studies can be very convincing in showing that a selection or competition effect does in fact occur. Very little can be said if no effect is measurable within the setting under study. This weakness is related to the case study approach inherent in micro studies. Not all HMOs are the same; in fact, there is even substantial variation in the operation and performance of the several Kaiser regions. Thus, a micro study in a single community provides little insight into whether similar communities would show larger or smaller responses. As will be seen below, however, there are times when negative results from several case studies can present a powerful argument.

Aggregate, or macro studies, while offering a less clear picture of how something happens, are well suited to determining whether something happens and what effect it has. Micro and macro studies obviously complement one another. Recognizing this relationship, the project was

designed to pursue a macro level analysis and use those results to determine appropriate topics for a number of micro level investigations. This was intended to allow us first to determine the magnitude of the selection and competition effects and then to use those results to guide our investigation into how those effects take place.

At the aggregate level of study, the selection and competition effects are best analyzed with different population groupings. The selection effect takes place (if it occurs) within a given employee group that has repeated dual choice options between an HMO and conventional coverage. The competition effect can be expected to involve all people with conventional coverage in a geographic area with substantial HMO penetration. In general, if the competitive effect leads to changes in practice patterns and insurance coverage, it will also influence people who do not have a dual choice option. The research design used different units of observaton and examined behavior over time and across regions to provide sufficient variation in the data to separate the competition and selection effects. This cross section-time series model was designed to increase the statistical power of the analysis and improve the likelihood of identifying the two effects if they are of any substantial importance.

The estimation of the selection effect can be best understood if one thinks of a firm that offers its employees a choice of a conventional insurance plan and HMOs where the latter are available. If there is no selection effect (and ignoring for the moment any competitive effect) then hospitalization rates among enrollees in the conventional plan should be independent of the proportion of employees who choose the HMOs.

(Obviously, measured utilization rates will reflect geographic differences in the age and sex compositions of the employees and a host of supply factors, but the estimation process was designed to hold constant those factors.) However, if employees who would normally be low users of hospital care disproportionately enroll in HMOs, then the hospitalization rates of enrollees in conventional plans will be positively related to the proportion of the firm's employees in the area who belong to HMOs.

While the selection effect is observed within a dual choice population and depends upon the HMO's share of that employee group, the competition effect depends on the HMO penetration in the whole geographic area. This means that the observed utilization rate for an enrollee group choosing conventional coverage will increase with the proportion of that group which chooses the HMO (the selection effect) and decrease with the proportion of total population in HMOs (the competition effect). The 1960-75 experience of federal employees who chose Blue Cross/Blue Shield coverage was to be used to estimate this combined selection and competition effect. Blue Cross/Blue Shield coverage is available to all federal employees, but HMO options are available in only selected areas. More importantly, the proportion of federal employees who belong to HMOs in some areas exceeds the general HMO market share.

If one examines a geographic area as a whole, the selection effect disappears because all persons are included, irrespective of health plan, and the utilization rate will depend primarily on the proportion of the population in the HMO (the competitive effect) and, to a small extent, the true HMO effect on its own enrollees. The utilization rate for the whole

population is the weighted average of the experience for people with conventional (or no) coverage and the experience for HMO enrollees. Given the relatively small market shares of HMOs (at most, 15 percent), and the likely size of the true HMO effect (probably, at most, 10-20 percent), the average will almost totally reflect the competitive effect. Overall hospital utilization in each state as reported by the American Hospital Association was to be used to measure the competitive effect.

Finally, if one examines a population with conventional coverage, such as Blue Cross, without consideration of whether or not they have dual choice, the utilization rate will be in an intermediate postion. There will be a negative competition effect stemming from the share HMOs have of the total market and a positive effect related to the proportion of people subject to dual choice and, therefore, subject to self-selection. Estimates of the competition effect from this last group will be biased towards zero, or be smaller than is truly the case. Utilization experience of Blue Cross enrollees will represent this third case. The latter two models provide estimates of the competitive effect that can be compared with those of the federal employees. A major advantage of the AHA and Blue Cross data is that they go back far enough in time to predate almost all HMOs, so that the HMO influence can be tracked as HMOs come into being.

In the process of analyzing the separate data sets and estimating the general model, geographic differences in hospital utilization and the impact of HMO growth in local market areas will emerge. Case studies of these effects were planned to supplement the aggregate level investigation and serve to strengthen the interpretation of the primary findings. In

particular, using American Hospital Association and Blue Cross data, trends in hospital utilization would be compared before and during the period when an HMO enters the medical market.

Hawaii, because of its geographic isolation, was thought to serve as a particularly valuable study. The Kaiser plan began there in the late 1950's, well after the California and Oregon locations, yet sufficiently long ago to allow the observation of long-term effects. Furthermore, the relative dominance of Oahu in terms of population means that state data can be used with little error, and the state's geographic isolation virtually eliminates "border crossing." Additional case studies were planned to investigate further some of the variables identified by the regression analyses as well as those states that appeared to be outliers. Although the case studies were seen as important components of the original proposal, they accounted for only 15 percent of research staff time.

Data Collection, Review, and Analysis

In the initial design of the project we recognized that the preparation of data from fifty states over a thirty-year period would be a substantial undertaking, and, therefore, the first year was to be allocated to those tasks. The underlying documents had been identified prior to the submission of the proposal, so the first stage of collection had been completed. However, we recognized that published data series have both documented and undocumented changes in methods and that errors occur in both the original source and in the various recoding processes.

Our approach was first to examine the source documents for consistency in definitions and for any footnotes or technical memoranda indicating changes in methods. Usually, all the data for a single variable or group of variables would be available in a series of volumes from the same source, such as the Bureau of the Census or the American Hospital Association. Even in those instances data occasionally had to be "patched in" from other volumes, for instance, data for Hawaii and Alaska in the years preceding statehood.* Major changes in the health care system, such as Medicare, often had subtle impacts on data series. For instance, since 1966 health insurance coverage data have been differentiated for the under-65 age population and those 65 and over. In earlier years such differentiation was not routinely made, so we expended substantial effort in estimating a consistent time series.

One of the advantages of the broad time span is that occasionally there will be several independent estimates for the same variable--or at least what at first glance appears to be the same variable. The best available source of data for the number of physicians by state by year is the American Medical Association. The decennial census also provides state counts of physicians for 1940, 1950, 1960, and 1970. Closer examination of the definitions used by the two sources indicated potentially significant differences--the AMA focused on total or patient care non-federal MDs while the Census focused on physicians in terms of occupation--thus including those employed by the federal government as well as osteopaths and implicitly excluding persons holding an MD or DO license but not practicing

*The importance of Kaiser in Hawaii made us reluctant to drop it as an observation.

medicine. An investigation of the alternate estimates provided by the two sources suggested reasonable comparability in the aggregate but substantial differences for a few states (Maerki and Luft, 1979).

A second advantage of pooled time series-cross section data is the ability to evaluate individual data points through consistency checks. After entering yearly data from the American Hospital Association, Blue Cross and the Federal Employees' Health Benefits Program, the data were reorganized to produce a time series for each state or grouping. These data were then printed as tables and as graphs to identify any marked changes in patterns. A substantial number of errors were identified and corrected. A small proportion of these were data entry errors--due either to the keypunchers or our coding. Some of the errors were typographical or arithmetic mistakes in the source documents. In other cases, changes in the classification of one or two hospitals in a state could result in major shifts in overall utilization variables. To check this, we tracked individual hospital listings in the annual AHA Guide Issues and made a determination based on all the available data. Although such error checking requires substantial effort, it has been our experience that a small number of outliers, which are often erroneous, can have a major impact on regression results. Furthermore, once the research gets to the stage of regressions, the raw data are most difficult to check. (See Mayer, 1980, for a discussion of data in economic research.)

Checking the data from Blue Cross and the American Hospital Association led to the observation of an apparent anomaly. The Blue Cross data exhibited a significant downward trend in hosptial days and admissions per thousand enrollees over the last decade, but no such trend was apparent

in the AHA data. Because Blue Cross plans account for one-third of all discharges among the under-65 age population, this divergence suggested either markedly different trends in use by the non-Blue Cross populations or an underlying data problem. Either situation could threaten the basic design of the project which relied upon a comparison of AHA and Blue Cross regressions to estimate the selection effect. It did not take long to surmise that the difficulties could be traced to the growth of duplicate health insurance coverage and sharp increases in utilization among Medicare disabled and Medicaid beneficiaries. (Duplicate insurance coverage leads to inflated enrollment estimates and, thus, deflated use figures.) Developing the evidence to test these hypotheses was a bit more difficult, but it now appears that the growth in duplicate coverage accounts for about one-half of the diverging trends in hospital admissions (Luft, 1981c).

Another phase of the data preparation resulted in the recognition of a different but related problem in the overall figures on health insurance enrollments. The Health Insurance Association of America prepares annual estimates of health insurance enrolllment in each state, and these data have been published since the late 1940s. They are the only such state data avaialble and have been widely used in previous studies. Upon examining the time series data for each state, it became apparent that 1973 represented a break in the series.* Footnotes in the documents indicated a change from employer-based to residence-based estimates. The person responsible for the data informed us that duplicate coverage was at

*The annual sourcebooks present the state data for the preceding year and a national time series. When the methods were changed, the national data were adjusted to make a consistent series, but no adjustments were made to state data for previous years. (See Health Insurance Institute, annual).

the state figures. The HIAA statisticians noticed that the resulting enrollment exceeded the under-65 age populations in some states and recommended a reallocation process.* The HIAA generously shared their worksheets with us so that we could recompute the 1973 and subsequent figures.

Fortunately, about this time we became aware of the 1976 Survey of Income and Education (SIE), a household-based survey of a wide range of topics, including health insurance coverage. Unlike other surveys of health insurance, the SIE sample was designed to provide reliable estimates at a state level. This allowed a comparison of the HIAA and SIE estimates for 1976. The two were rather different, with an R^2 of only .3. Moreover, it appeared that much of the problem stemmed from the HIAA's adjustment technique for duplicate coverage. This led us to examine the factors that could explain duplicate coverage at a state level. We also developed synthetic estimates of net coverage by state and year for 1950 to 1976 using regressions based on the SIE and regional benchmarks from other surveys for 1953 to 1974 (Luft and Maerki, 1982).

The synthetic estimates of insurance coverage would be adequate for use as independent variables in the utilization regressions. However, in order to adjust the Blue Cross enrollment figures with the synthetic the root of the problems. The HIAA has a formula to convert gross enrollment data obtained from the carriers to estimates of net enrollment. Although this formula is based upon national data, it is also applied to

*This problem may have been overlooked by most users of the data because the figures are published as total enrollments, rather than as percent covered, so one muust obtain and divide through by the population estimates. This last step is usually done in the computer and the resulting ratio entered into the regression without detailed examination.

estimates, we would have to assume identical duplicate coverage patterns, both cross sectionally and over time, for Blue Cross and all insurance carriers. Some Blue Cross plans were known to have exceptionally high or low duplicate coverage rates, so this assumption was untenable. Moreover, the selection effect was to be derived by comparing the AHA with the Blue Cross and FEHBP estimates, which suffer from the same problem. Synthetic estimates may be used as an independent variable, but to use them as an adjustment to a dependent variable seems quite unacceptable, especially when attention will be focused on differences in coefficients across data sets. Therefore, we reluctantly abandoned the analysis of the Blue Cross and FEHBP data, and, hence, our attempt to separate the selection and competitive effects. The AHA data, however, seemed reliable, so we continued with preparations to estimate the competitive effect.

Interface of Macro and Micro Studies

In the original proposal, micro case studies were intended to complement the macro time series-cross section regression estimate and provide a sense of how competitive and selection effects took place. Some micro studies were planned to explain outliers from the regressions, but others would be "freestanding" investigations of places where substantial competitive effects were thought to occur.* A separate grant from the California Policy Seminar was supporting an analysis of the medical care market in California (Butler et al., 1981). Preliminary findings indicated active competitive processes, but for the two areas investigated in detail,

*There is little empically-based disscussion of selection effects in the literature, so the case studies were to focus primarily on competitive effects.

Sacramento and San Diego, there was no convincing evidence of cost or hospital use containment stemming from the development and growth of the Kaiser Plan in the mid-1960s. These negative findings heightened our interest in micro studies of other parts of the country.

Hawaii was an area that immediately came to mind because of the relatively large Kaiser enrollment and low hospital use rates by both Kaiser and conventionally insured enrollees. Kaiser entered Hawaii in 1959, well after any postwar adjustments, yet long enough ago to allow the appearance of lagged responses. Hawaii's isolation and the population concentration in Oahu meant that state data could be used, thus allowing a richer set of source materials than is available at the metropolitan or county level.* Rochester, N.Y. became a site for study with the publication of a report by the local Health Systems Agency that attributed a sharp decline in hospital use by Blue Cross members to the competitive influence of local HMOs. The HSA Task Force went on to recommend that in recognition of the community's benefits from competition Blue Cross forgive a $3.3 million loan to the major HMO (Finger Lakes Health Systems Agency, 1980). Rochester was also interesting as a micro study because some earlier work on this project identified a clear selection effect among certain enrollees in the HMOs (Luft, 1981a). The choice of Minneapolis-St. Paul as a third site was based largely on the widespread attention given that area and the identification of the Twin Cities as being almost unique in having a large number of HMOs competing with each other. There was no doubt that a

*Data availability was an important consideration in the micro studies as travel funds were not available.

competitive process was under way--the question we attempted to answer was whether there is evidence of a cost-containing competitive outcome.

The research process in the case studies differed markedly from that of the larger project in which there was a clearly defined model and data sources to test hypotheses. In the micro studies the approach was similar to detective work--sometimes starting with an alleged relationship (Rochester), sometimes starting with a much more general question of whether there is a cost containing effect (Minneapolis-St. Paul). The available data ranged from published AHA data at the state, metropolitan area or hospital level to Health Systems Agency statistics to figures from local carriers. Unpublished data for Medicare and Medicaid beneficiaries were obtained from HCFA, state, and local officials. We even obtained data from the Defense Department concerning utilization at Tripler Army Hospital in Honolulu. The range of data sources gives only a partial sense of our investigative approach. For instance, the Rochester HSA staff pointed to the refusal by local nursing homes to accept Medicare and Medicaid patients, thereby forcing them to back up in acute hospitals and, thus, leave no room for the under-65 Blue Cross enrollees (Finger Lakes Health Systems Agency, 1979). If true, we should be able to observe increases in Medicare and Medicaid inpatient days, reductions in Medicare and Medicaid nursing home admissions, pressures on hospital occupancy, and offsetting declines in Blue Cross patient days, with the correct (that is, logically consistent) timing for these changes. Our results provide at least partial support for the "backup" hypothesis (Luft, Maerki, and Trauner, 1982). They also provide ample evidence of gaps and inconsistencies in the available

data for all three areas. One quite successful approach that we used was to send on-site correspondents a first draft of our findings and interpretations using the best data available. They helped correct certain figures and ofter were able to provide important but previously unknown data sets.

The most disconcerting data problem arose in the analysis of Hawaii. Between 1971 and 1974 inpatient days in community hospitals as reported by the AHA fell by 24 percent. A substantial part of this decline is attributable to the closure of long term beds in short term hospitals. If a relatively small number of long term care beds could alter statewide utilization rates, then might not similar changes explain some of the temporal trends in hospital use? Furthermore, might regional differences in the use of long term beds within short term hospitals explain some of the regional differences in utilization patterns? Since an analysis of regional and temporal patterns underlay the proposal estimation of the competitive effect from the AHA data, what impact might the unknown level and changes in long term bed use have on the overall analysis?

At the same time that we were beginning to question the validity of the AHA data, the preliminary findings of the three micro studies raised further doubts about undertaking the time series-cross section study. In each area we found either little evidence of true reductions in hospital use or reductions in utilization more plausibly attributed to factors other than HMO competition (Luft, Maerki, Taurner, 1981). The two California markets, San Diego and Sacramento, gave similar results. We were now in a quandry. The macro data analysis was supposed to estimate the <u>size</u> of the

competitive effect, and the micro case studies were to explain how the effect took place. We now had five case studies indicating either no effect or worse, a reduction in use that was roughly correlated with HMOs yet probably due to other factors. If the macro estimates showed a statistically significant negative coefficient for HMOs, how could we in good faith attribute the reductions in use to an HMO competitive effect when case studies of five promising locales showed no such effect? The nature of the negative results in Rochester, Hawaii, and Minneapolis-St. Paul re-enforced our hesitancy to do the macro study. Careful analysis of each area showed how aggregate utilization data could be misleading, especially when examined over time while searching for a competitive HMO effect.

The decision to abandon the time series-cross section model was made somewhat easier by very preliminary results from a cross section study of metropolitan areas. This piece of research had been designed to complement the larger study. Because it was a single cross section for 1975, it could provide little solid evidence about causation, nor could it separate the selection and competition effects. The preliminary results indicated no measurable competitive effect, further supporting the case studies. Work on that study had been halted in 1979 while awaiting estimation of the full model. We now chose to re-examine the SMSA regressions in lieu of the full-scale time series-cross section model. Although it would not provide the same detail and in many ways suffered from the same data shortcomings, the probable conclusions were at least worth a minimal effort.

Lessons from the Experience

Most courses on research deal with formal methods and statistical techniques as applied to ideal sets of data. Yet, almost every empirically-based researcher must deal with large and small decisions concerning problems, inconsistencies, and holes in the available data. Traditional methods courses are analogous to courses in architectural design that focus on the concept and grand scheme for a building. The creation of the structure, however, requires implementation of the design by a contractor who follows the architect's design, yet makes minor adjustments to accommodate irregularities in the materials, the need for supporting devices during construction, and the capabilitites of the workers. Not surprisingly, the contractor's skills are acquired largely through apprenticeship and learning-by-doing because the necessary judgment and "tricks of the trade" cannot be readily taught in the classroom or through books.

This description of the research process in one project is not meant to be an example of the best possible approach. Instead, it is intended as an example of one project that we hope may be directly useful to others or indirectly useful by encouraging other researchers to describe their own processes. At the risk of overgeneralization and, perhaps, a little defensiveness, some lessons for the future might be drawn from this case study. These lessons deal with secondary data sources, techniques in empirical research, and the general setting in which research is undertaken.

Secondary Data Sources

Health services research is often done using secondary, or previously collected, aggregate data. For certain questions, such as the impact of HMO on communities, one must use such aggregate information, and, unless massive funds are available to collect new data, secondary information must be used. Current trends in research funding suggest that inexpensive secondary data will be used even more frequently as researchers attempt to squeeze the maximum amount of analysis from ever smaller budgets.

By definition, secondary data was collected by someone else for some other purpose, often a non-research purpose. In some cases, the unwary researcher may not realize that definitional and other problems may compromise the validity of the data. For instance, the American Medical Association's figures on the distribution of physicians omit osteopathic physicians who often substitute for MDs. The American Hospital Association classifies hospitals as long or short term, but does not report separate utilization rates associated with long term beds in short term hospitals. The Health Insurance Association of America recognized the problems of duplicate health insurance coverage but lacked the data on which to make accurate estimates of net coverage at the state level. Insurance carriers generally have their marketing departments estimate enrollments, but since premium quotes can be based upon annual changes, there are no reasons to account accurately for duplicate coverage.

There are no simple techniques for identifying such underlying problems in the data. Among the approaches we used was the comparison of

several independent estimates of the same underlying concept. Comparisons of AMA and Census estimates of physicians highlighted the definitional problems. Different hospital use trends from Blue Cross and AHA data led to the identification of the duplicate coverage problem. The Survey of Income and Education provided a benchmark for the HIAA data. Another technique is to examine the data for internal consistency. Marked year-to-year changes in the hospital data by state pointed to the problem of individual hospital classification and the importance of long term beds in short term hospitals.

Some techniques are almost trivial--after the fact. Merely dividing the HIAA net enrollment estimates by the relevant population would have revealed several states with exactly 98 percent coverage. Not only is such a high level of coverage unlikely, but when five states have exactly the same level, something bears further investigation. Thus, scaling data to the appropriate rates can often be very informative. Merely printing out the raw data and looking at the tables often points out keypunch, coding, and source document errors. Unfortunately, such simple errors can have major and unnoticed impacts on regressions results.

Careful reading of footnotes and methods sections associated with secondary data is imperative. Such sections usually describe what was done, but they rarely include warnings to the researcher about limitations and hazards in using the data. (This rarely reflects intentional deception because the data were not intended for nor prepared by researchers.) One way to approach the issue of data quality is at each step to ask where the information came from, how it was collected, and, then, whether the data

collection scenario is likely to result in the desired data for the research project. For instance, it is unusual for a complete census to be done to collect data. Rather, most data are themselves drawn from administrative or other records. Even in the few instances in which a census is done, one will need to know how the data are collected from the relevant universe and what that universe is. Even the decennial census, which is often perceived as the "gold standard" against which other data sources are to be measured, has an unknown degree of error due to undercounting certain population groups.

Techniques in Empirical Research

In a world of perfect data and simple models derived from unambiguous theory, it is a relatively simple task to choose the appropriate statistical tests for hypothesis testing. In the more complex world of empirical health services research, simple hypothesis testing has a substantial chance of producing incorrect results because of unrecognized problems with the data and model.

Perhaps the most important point is that the medical care system is so complex and poorly understood that results supporting hypotheses are of relatively little value unless once can simultaneously reject all plausible alternative explanations. Our case studies of the competitive effects of HMOs all began with some evidence supporting the notion of a cost-containing competitive effect, yet alternative explanations of the available data seem more reasonable. In order to identify such alternative

explanations, it is useful to think of medical care in systems terms and to look for analogs to double entry bookkeeping. Cost containment for a population implies income reduction for providers, reductions unlikely to have gone unnoticed. Reduced hospital use by Blue Cross enrollees should be reflected in reduced hospital census and occupancy--unless other people have an increase in use. Altered incentives of IPAs should have their greatest impact on IPA enrollees, then on similar conventionally insured patients of the same physicians, and, lastly, on publically funded patients. If the results differ, then perhaps there are different causal relationships.

Given the paucity of simple yet crucial empirical tests, the conservative researcher should have several independent findings giving consistent results before reaching firm conclusions. Repeated studies using similar data and methods are less convincing than comparable results using markedly different methods. Our findings of no measurable cost-containing competitive effect in several case studies reinforce one another. These tentative conclusions from micro case studies are strengthened by similar results from the aggregate metropolitan area analysis.

Regardless of how careful one is in collecting and preparing the data, errors are inevitable, so one should try to reduce the possibility that errors lead to substantially incorrect results. If sample sizes permit, split the data and estimate models twice; the results should be very similar. When possible, use estimating techniques that are insensitive to outlying observations, or at least examine the residuals from the regressions to make sure outliers are not due to errors.

Surprisingly strong results bear careful scrutiny prior to bringing out the champagne.

Finally, researchers should use the expertise and institutional knowledge of non-researchers in the health care system. Physicians, planners, and administrators often have an intuitive understanding of what is--or is not--occurring, yet it is difficult to incorporate this knowledge in a data collection scheme. Open ended questions are sometimes fruitful, yet there often appears to be a barrier between the researcher and practitioner that arises from the different ways a situation is conceptualized. One approach we have found useful is asking for comments on initial interpretations of data. The preliminary document serves as something concrete that elicits thoughtful commentary and suggestions. Some of the ideas lead down blind alleys, but these can be seen as alternative hypotheses that are rejected. Other ideas have been most valuable in redirecting our analysis and in providing qualitative support for quantitative findings.

Improving the Research Environment

The preceding disucssion has focused on the metamorphosis of a research project and how one might be alert to the need for similar changes in other projects. However, one may ask whether such changes should be encouraged. It is our feeling that the original proposal was designed as carefully as possible and that the data problems we encountered could not have been reasonably anticipated. (The proposal was reviewed by several

experienced researchers, none of whom pointed out the duplicate coverage problems.) We could have continued with the project, arguing either that the Blue Cross enrollment and utilization figures were the best available or that adjustment by the duplicate coverage rate would be sufficient. We could even have ignored the problem and done the project exactly as outlined in the proposal. Statistically significant results would have been obtained and interpretations offered--some reasonable and some obscure--and another piece of complex empirical research added to the literature.

We were most fortunate in having a project officer at HCFA, Benson Dutton, who treated the project like the grant that it was, rather than as a contract. He also listened to our analysis of the data problems and accepted our recommendations for reorientation. He trusted our judgment and was willing to let the overall project be evaluated on the basis of its products, not the degree to which it matched the proposal.

In an era of increasing calls for accountability in the expenditure of public funds, is it appropriate for granting agencies to take such a flexible approach with their grantees? We would argue that to eliminate such flexibility will almost guarantee a sharp decline in the quality of the research. It is impossible to anticipate all the potential problems that may occur in a project, irrespective of how much work has gone into the planning. Although the primary focus of our discussion has been on the quantitative aspects of the project using secondary data, similar problems can occur with primary quantitative and qualitative data. For instance, some surveys have response rates that warrant only a discussion of why the

response was so low, rather than detailed interpretation of the returned questionnaires. Similarly, qualitative case studies may find extremely limited access to certain sources or the perception among the respondents that the research questions totally miss the mark. To forge ahead with the original protocol casts aside a commitment to uncovering the truth.

If projects were terminated as soon as deviations became necessary, there would be immense pressures upon the researchers to ignore warning signals in the data. Furthermore, the potential restrictions and attendant uncertainty are likely to drive the most competent researchers to other fields. Problems occasionally occur that are so serious that the project should not be continued at the same scale, but appropriate changes can be negotiated, and few researchers would want to commit several years to a project with known major flaws. It may be easier for everyone to abandon a major but flawed project if funds are made available for an orderly wind-down and presentation of the appropriate preliminary results as well as a discussion of the lessons of the project for other researchers.

How should the appropriate balance be struck between flexibility and accountability? The first step is to distinguish carefully projects that should be treated like contracts from those that should be treated like grants. Contracts are most appropriate for projects with fairly straightforward approaches, such as data collection and preparation. Projects requiring more analysis and interpretation require more flexibility and, thus, the structure of a grant.

The second step is to develop a trusting relationship between the granting agency and the investigator. The agency should use peer review

study sections and expert project officers to assure that the investigators are competent and then trust that they will do the best research possible. The investigator should be convinced that the agency will view a less than glowing progress report as an occasion for problem solving and possible redirection rather than an opportunity to terminate the project. Formal and informal progress reports should be encouraged as opportunities to discuss preliminary results, interpretations, and mid-project changes, rather than as moments of anxiety, posturing, and uncertainty.

If both the agency and investigator start with a presumption that the project will be carried through to completion unless major problems occur, both parties are likely to be more open in discussing the relatively small changes that can improve substantially the quality of the research. It will not be easy to develop such a trusting environment, yet the importance of knowing more about the medical care system in order to design appropriately national policy means that we must have not only more research but research more free from error.

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Chapter 3

Hawaii*

The health insurance market in Hawaii exhibits clear competitive features. The Kaiser-Permanente program entered the state in 1958 and now enrolls about 13 percent of the civilian population. The Hawaii Medical Service Association (HMSA) is a Blue Shield plan enrolling about 54 percent of the civilian population. HMSA's influence is enhanced through its role as fiscal intermediary for Medicare and CHAMPUS beneficiaries. In 1972 HMSA sponsored the Community Health Program, an HMO composed of nine group practices which now enrolls over three percent of the population.

The competition between Kaiser and HMSA has been identified by Alain Enthoven (1980) as a paradigm for other areas:

> Kaiser's entry into the market put pressure on HMSA to improve its benefit coverage and to strengthen its cost controls. Kaiser, in turn, found it necessary to depart from its traditional style of delivering all of its services in large medical centers and to set up five small outpatient clinics on Oahu at locations convenient to members, in order to compete effectively with HMSA's individual-practice style. Kaiser and HMSA both report hospital use for employees and their families (that is, the under sixty-five age group) at or below 400 days per 1000 per year. Even after adjusting for the age of the population, Hawaii's hospital use is about 75 percent of the national average. Hawaii has about 3 short-term community hospital beds per 1000 civilian population, compared with a national average of about 4.6. Thus the excess of hospital beds that adds so much to costs in most areas is not a problem in Hawaii. As a result, hospital cost per capita through the 1970s was about two-thirds of the national average, despite the fact that the cost of living generally was about 20 percent above the national average. HMSA and Kaiser premiums for comprehensive care are among the lowest in the Federal Employees Health Benefits Program.
>
> Various factors besides competition contribute to this desirable situation in Hawaii. The population is young. Cultural factors and healthful lifestyles play a part. But based on direct observation as well as study of the data, I believe that vigorous and effective competition between HMSA and Kaiser

*by Harold S. Luft and Susan C. Maerki.

> has been the key factor in achieving these lower costs. Both organizations make strenuous efforts to hold down costs while giving good service and comprehensive benefits to their members, in order to remain competitive with each other. And the fact that the two competitors dominate the market is important, because individual providers have a hard time escaping the cost controls of one or the other health plan (p. 85).

One way to examine the hypothesis that the competition between Kaiser and HMSA has resulted in cost-containment, or at least hospital utilization containment, is by examining the trends and levels of hospital use in Hawaii. If there is a cost-containing competitive effect, then hospital use in Hawaii should be substantially lower than on the mainland. Furthermore, the lower use should be traceable to the entry of Kaiser, and, given the dominance of HMSA and Kaiser in the Hawaii market, the cost-containing efforts introduced by HMSA for its own enrollees should exhibit spillover or ripple effects for others, such as Medicare or Medicaid beneficiaries. The latter expectation is based on the notion that competition leads conventional fee-for-service providers to learn cost-effective practice patterns, which they use for all of their patients, not just those with particular types of coverage.

To examine the competitive impact of Kaiser in Hawaii, see Figure 1, which presents hospital utilization rates for Kaiser, for group enrollees in HMSA, and for total use of community hospitals in Hawaii as reported by the American Hospital Association and by the State Health Planning and Development Agency (SHPDA) for the last six years. As Enthoven pointed out, the HMSA utilization rate is comparable to Kaiser's, and more importantly, both have been falling since 1965. Although the HMSA group utilization rates are comparable to the total Kaiser figures, the Kaiser

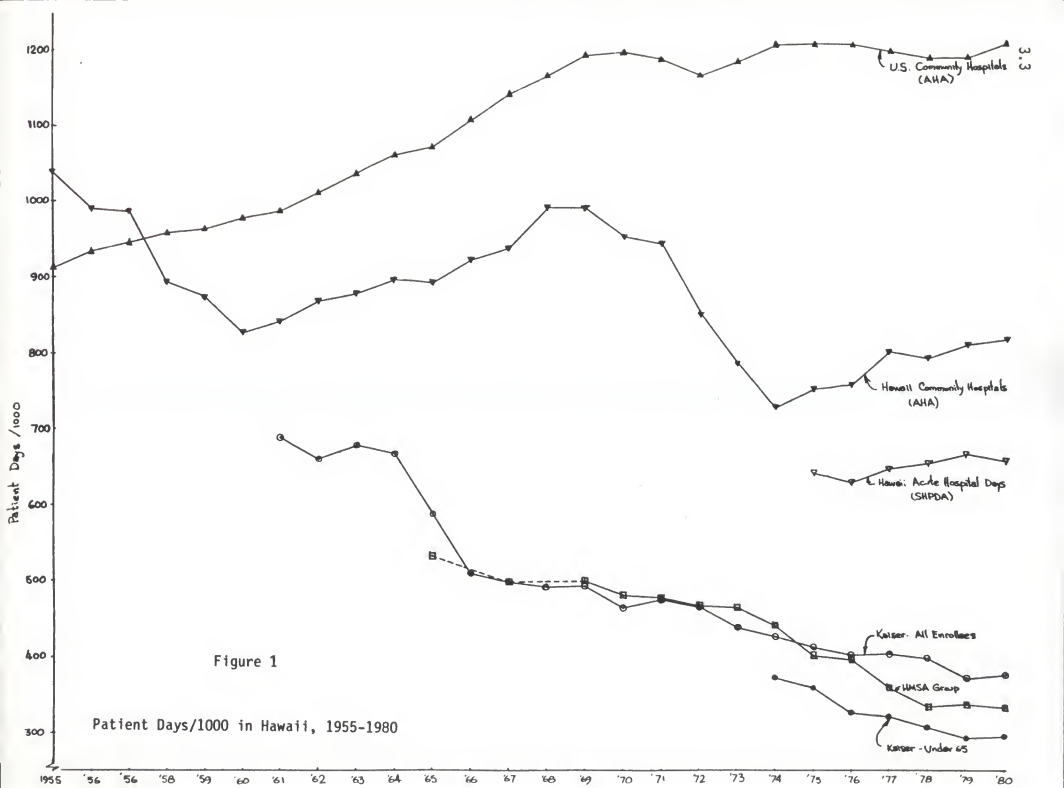

Figure 1

Patient Days/1000 in Hawaii, 1955-1980

Figure 1

Patient Days/1000 in Hawaii, 1955-1980

Sources:

U.S. and Hawaii Non Federal Short Term General and Other Special Hospitals (STGOS). Average daily census or inpatient day counts from the American Hospital Association annual Guide Issue, 1956-1970, Hospital Statistics, thereafter. Hawaii data for 1955, 1956, and 1968 are based on state summary data plus Puumaile and Hilo Memorial Hospital, which was classified as long term for those years only. Populations represent civilian residents, updated by 1980 Census benchmark, from U.S. Bureau of the Census and Hawaii State Data Book, 1980 edition. (Hawaii Department of Planning and Economic Development, 1981.)

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Kaiser data for 1961-1964 are reported in Bailey, 1970. Data for 1965-1980 are supplied by Kaiser Foundation Health Plan (Nina Augur, August 11, 1981; Jonathan Gans, January 15, 1982). These figures refer to covered member patient days in Kaiser Foundation Hospital in Hawaii and Maui Memorial Hospital and exclude covered services at non-Kaiser hospitals, which amount to about 5-6 percent over the period.

SHPDA data are from the Hawaii State Health Planning and Development Agency. Department of Health Annual Report, 1981, and Summary of Acute Care Hospital Statistics for 1979-80.

rates for their under 65-year-old enrollees are substantially lower, but the trends are comparable. However, overall hospital use in Hawaii shows a rather different pattern: a very sharp decline of nearly 250 days per 1000 between 1969 and 1974, followed by an increase of nearly 100 days per 1000 by 1980. In the face of the falling HMSA and Kaiser utilization rates, this increase in overall use is disconcerting and, because of its inconsistency, suggests that the competititve effect may be less than what it appears to be at first glance. Moreover, the declining hospital use by HMSA and Kaiser enrollees started in the 1960s, while the total utilization rate in Hawaii was undergoing a substantial increase.

Total Hospital Use in Hawaii

Before examining why the utilization rates for Kaiser and HMSA enrollees differ from that of the state, it is useful to examine overall hospital use in Hawaii, which shows a marked divergence from the U.S. pattern in the late 1950s. Between 1955 and 1960 Hawaii's utilization rate fell from 1039 days per 1000 to 828, while the U.S. average rose from 912 to 977. These different trends began well before the actual entry of Kaiser in Hawaii in 1958, and thus the lower hospital use rate in the 1960s in Hawaii is unlikely to be a result of competition from Kaiser. Furthermore, during the 1960s hospital use in Hawaii grew at an annual rate of 1.9 percent, only slightly lower than the 2.3 percent annual growth nationally.

The possibility that Kaiser would start a plan in Hawaii was recognized as early as 1955, and a 1956 report on hospital requirements for Oahu notes that the development of a prepayment plan could alter the utilization projections (Blumberg et al., 1956).* However, the report assumes a constant utilization rate in its projections from 1955 to 1960 and 1965, without any discussion of substantial "fat in the system," which could be reduced by changing patterns of treatment. The threatened expansion of Kaiser into the San Joaquin Valley is often given as an explanation for the development of the San Joaquin Foundation for Medical Care (Harrington, 1971). In a similar fashion, Goldberg and Greenberg's case study of Hawaii points out that HMSA claimed to have an effective cost control system prior to Kaiser's entry in 1958 and subsequent competition reenforced the need to emphasize cost containment, as well as to provide some expansion of its outpatient benefits (Goldberg and Greenberg, 1979). Bailey's 1970 study of Hawaii also mentions active competition between Kaiser and HMSA, but omits any discussion of a precipitous decline in use during the late 1950s. While it is possible that the anticipation of Kaiser's entry led to major changes in hospital use, this is only conjecture unsupported by documentation.

The data in Figures 1 to 3 provide a hint as to what may be causing the variations in overall hospital use in Hawaii. Although there is a moderate amount of year-to-year change, and some short cyclical patterns,

*1955 was chosen as a starting date for the data in Figure 1 because earlier figures on hospital use show substantial instability due to non-reporting and reclassification of specific hospitals.

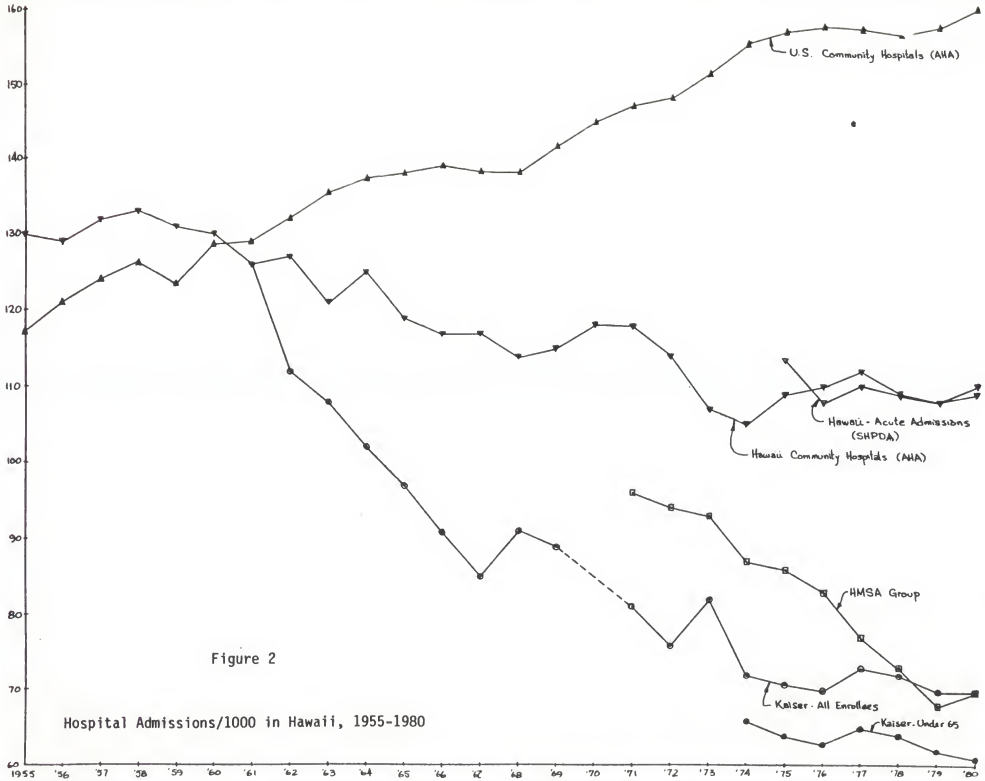


Figure 2

Hospital Admissions/1000 in Hawaii, 1955-1980

Figure 2

Hospital Admissions/1000 in Hawaii, 1955-1980

Sources:

U.S. and Hawaii data--Short Term General and Other Special Hospitals, data from American Hospital Association, annual Guide Issue, through 1970; annual Hospital Statistics, thereafter. The low 1959 U.S. admission rate is due to a much lower than usual growth in reported admissions between 1958 and 1959. Hawaii data for the years 1955, 1956, and 1968 use state summary data with adjustments from hospital specific data to include hospitals usually classified as short term that were coded as long term in those years. These were Puumaile and Hilo Memorial Hospital in 1955, 1956, and 1968. For 1959 admissions for St. Francis Hospital (non-reporting) were estimated by interpolation.

Populations:
civilian resident populations, from U.S. Bureau of the Census, revised to reflect 1980 Census benchmark.

Kaiser data:
1961-69, from Bailey, 1970, Table 26. Member patient days/1000 members, in Kaiser and non-Kaiser hospitals.

1971-74, from Christianson, 1978, Table 12, from data supplied by Kaiser.

1974-80, from Jonathan Gans, Kaiser, January 15, 1982. Covered member patient days in Kaiser Foundation Hospital in Hawaii and Maui Memorial Hospital. Excludes covered services at non-Kaiser hospitals, about 5-6 percent over the period.

HMSA data:
1970-77, from Christianson, 1978, Table 12, from data supplied by HMSA.
1978-80, from HMSA May 18, 1981. Covered days for group, non Medicare enrollees. (Note: Bailey reports only patient days for 1965-1969 for HMSA.)

SHPDA data:
from Hawaii State Health Planning and Development Agency. Department of Health Annual Report, 1981 and Summary of Acute Care Hospital Statistics for 1979-80.

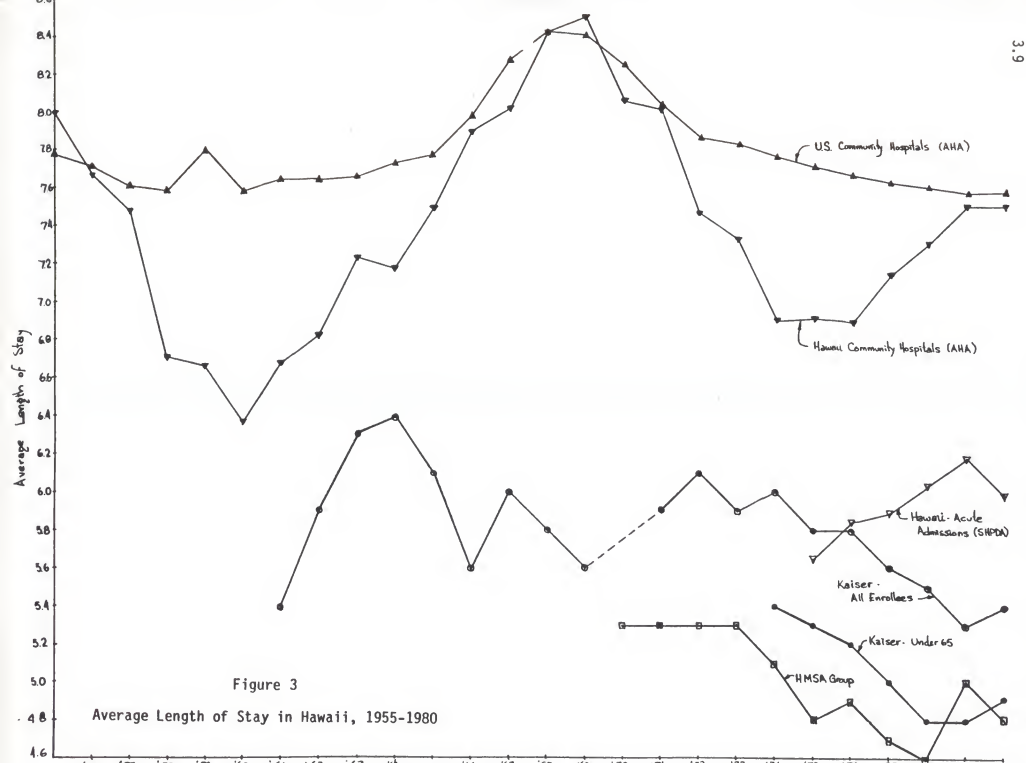


Figure 3

Average Length of Stay in Hawaii, 1955-1980

Figure 3

Average Length of Stay in Hawaii, 1955-1980

Sources:

See Figures 1 and 2.

there has been a consistent decrease in hospital admissions per 1000 population in Hawaii throughout the 1955 to 1980 period. (A regression fitted through the points indicates an annual decline of 1.09 /1000 with a t-ratio of 13.7 (R^2 = .88). At the same time, nationally there is a long term annual increase in admissions of 1.71 /1000 (R^2 = .98). Changes in the age-sex composition of Hawaii relative to the rest of the nation can account for some of the difference. (These adjustments are based on the age-sex composition of Hawaii and age-sex specific hospitalization rates for the U.S. See U.S. Public Health Service, 1960, 1962, Series C-3, B-32; U.S. National Center for Health Statistics, 1973, 1978, 1981, Series 13/14, 13/37, 13/60.) The sharp declines in patient days per 1000 in Hawaii during the late 1950s and early 1970s are the result of precipitous declines in length of stay (LOS) during these periods. Between 1955 and 1960 average length of stay fell 20 percent from 8.0 to 6.37 days in contrast to a 2.6 percent decline nationally. Between 1969 and 1974, stays in Hawaii fell 19 percent in contrast to an 8 percent decline nationally. Thus, an explanation of the major shifts in hospital use in Hawaii will probably be found through an examination of the causes of these length-of-stay patterns.

The substantial differences in average length of stay reported by the State Health Planning and Development Agency (SHPDA) and the AHA reflect the presence of long-term beds in short-term hospitals. Between 1975 and 1980 average stay, using the AHA data, was about 21 percent higher (range 18-25) than using the SHPDA data. (Since the admissions data are roughly comparable--long term beds account for few admissions--this implies that

about 18 percent of the patient days reported by the AHA for short-term hospitals are really attributable to long-term patients. One must then ask whether the exaggerated swings in LOS in Hawaii are caused by shifts of long-term patients into and out of short-term hospitals. Data for acute admissions are only available since 1975, and counts of patients or beds in long-term units are unreliable prior to that. The AHA does note, however, when hospitals have long-term units making it possible to compute length of stay for all hospitals without long-term units at any time for the period 1965-1980. (Indications of long term units in the AHA Guide Issues were supplemented by SHPDA surveys of long term beds.) Table 1 presents these data, as well as several other series on length of stay. The length of stay in these selected short stay hospitals is slightly lower than the SHPDA figures, but the patterns for 1975-80 are very similar: a rise of about 7-9 percent from 1975 to 1979 followed by a small fall-off. (Year-to-year discrepancies are not surprising given differences in definitions, periods covered, and missing data for selected hospitals.) The similarity between columns 1 and 2 in the table is most impressive: both rise by 14 percent from 1965 to 1969, then fall 19-23 percent by 1976, then rise 8-9 percent by 1980. The correlation between the two series is .92, strongly indicative that the patterns in length of stay are not simply attributable to the movement in and out of patients in long-term units of short-term hospitals.

The remaining data in Table 1 suggest that the factors behind the length-of-stay patterns are pervasive in that they appear in a similar fashion for Medicare aged beneficiaries and for all non-Medicare-Medicaid

Table 1

Average Length of Stay in Hawaii - Selected Series

	Non-Federal STGOS Hospitals (AHA)[1]	Non-Federal STGOS Hospitals without Long Term Beds[2]	Non-Federal Acute Hospital Beds (SHPDA)[3]	Medicare Aged Beneficiaries[4]	Non-Medicare - Medicaid Patients[5]	
					AHA Base	SHPDA Base
1965	7.49	6.17		-		
1966	7.90	6.70		12.3		
1967	8.02	6.68		12.9		
1968	8.43	6.73		n.a.		
1969	8.51	7.01		n.a.		
1970	8.06	6.26		12.4		
1971	8.02	6.01		12.0		
1972	7.47	5.91		10.7		
1973	7.33	5.77		9.6		
1974	6.90	5.61		9.5	6.68	n.a.
1975	6.91	5.52	5.65	10.1	6.77	4.67
1976	6.89	5.41	5.84	9.1	6.81	5.21
1977	7.14	5.64	5.89	9.8	6.92	5.05
1978	7.30	5.68	6.03	10.3	7.01	5.08
1979	7.50	5.92	6.18	10.3	7.31	5.31
1980	7.50	5.84	5.98	n.a.	7.35	5.08

n.a. = not available

Notes, Table 1

1. Non-federal short term general and other special hospitals, average length of stay computed from admissions and average daily census or patient days as reported in the annual American Hospital Association Guide Issues and Hospital Statistics, Note: some of these short term hospitals include long term care units.

2. Average length of stay for patients at Leeward, Kapiolani, Queens, Molokai General, Waialua, Maui Community, and Straub Hospitals. With the exception of Kaiser Foundation Hospital, these are the only non-federal short term general hospitals without long term units for the entire period. In 1980 these hospitals accounted for 51 percent of all admissions in the state. The presence of long term beds was determined by using reports in the American Hospital Association Guide Issues (the source of admission and census data) and the SHPDA inventory of long stay inpatient facilities for 1978 and 1980.

3. Hawaii State Health Planning and Development Agency, annual tables, acute admissions and patient days to all hospitals except Tripler.

4. Data are for covered days of care in short-stay hospitals. Data for 1966 refer only to the last six months of the year. 1967 and 1978-79 are calendar years, other data are for fiscal years. Data for 1978-1979 refer to the Hawaii PSRO, which includes Guam and other Pacific islands. Sources: U.S. Social Security Administration, Office of Research and Statistics. Medicare, Health Insurance for the Aged, 1966, Section 4.1: Short-Stay Hospital Utilization, Washington, D.C., USGPO, 1973, DHEW (SSA) 73-11704; _____, Medicare, Health Insurance for the Aged, 1967, Section 4.1: Short-Stay Hospital Utilization, Washington, D.C.: USGPO, 1975, DHEW (SSA) 75-11704; _____, Selected State Data, Medicare, Fiscal Years 1969-1973, Washington D.C.: USGPO, 1976, DHEW (SSA) 76-11711; U.S. Health Care Financing Administration, Office of Research, Demonstrations, and Statistics, Medicare: Health Insurance for the Aged and Disabled, Selected State Data, 1973-1977. Washington, D.C.: USGPO, DHHS(HFCA) 03059, 1980; unpublished data from Health Care Financing Administration, Office of Research, Demonstrations, and Statistics, "Table A-9 - Number of Discharges, Days of Care, and Mean Length of Stay for Short-Stay Hospital Discharges by PSRO and Year of Discharge, Quarter Ending 038001."

5. These estimates are derived by subtracting admissions and patient days of Medicare or Medicaid beneficiaries from either the AHA or SHPDA series. Computations and sources are shown in Appendix Table A-1. The Medicare-Medicaid use is the combination of use under the two programs less Medicaid use by over-65 and totally disabled beneficiaires. Without this adjustment the non-Medicare-Medicaid length of stay is slightly lower, but follows the same pattern as shown here.

patients. (In fact, as will be discussed below, the only major aberrations are inconsistent patterns for HMSA and Kaiser enrollees.) Providing a comprehensive explanation for these changes in hospital use are beyond the scope of this paper; however, several potential explanations are worth examining. Among the factors that might have an effect on the patterns of hospital use in Hawaii over the last 15-20 years are the availability of Tripler Army Medical Center for civilian dependents of military personnel, the state's mandatory health insurance coverage law, a program by HMSA to refuse payment for excessive hospital stays, the growth of "come and go" surgery, and the role of group practices.

Hawaii is the base for a substantial number of military personnel who receive their care primarily at Tripler Army Medical Center. Because military personnel are excluded from the civilian population figures used in this analysis and Tripler is excluded from the hospital figures, direct military use will not affect the findings. Civilian dependents of military personnel, however, are covered by the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) and are supposed to receive most of their care through military facilities, if space is available. Hawaii has no Veterans Administration Hospital, so Tripler is also the primary provider for the substantial number of veterans who avail themselves of VA benefits. If services are not available at Tripler, they can be obtained by local private providers with reimbursement by the appropriate agency.

One potential explanation for the patterns in the use of community hospitals is that changes in military use of Tripler during and after the Vietnam War caused a shift of civilians into the private sector during the

Table 2

Civilian Use of Tripler Army Medical Center and CHAMPUS Utilization in Hawaii

	Tripler Army Medical Center[1]					CHAMPUS[2]	
	Dispositions		Bed Days				
	Active Duty Military Personnel	Others	Active Duty Military Personnel	Others	Non Availability Statements (Fiscal Year)	Admissions	Hospital Days
1964	5,055	15,093	95,414	100,790			
1965	4,811	13,729	104,375	88,090			
1966	4,800	14,081	116,231	96,900			
1967-70	not available						
1971	4,547	15,485	91,117	107,244			
1972	4,979	17,360	82,199	116,951			
1973	5,686	17,961	78,433	113,655			
1974	5,380	17,573	64,907	108,370		2,005	15,409
1975	6,151	18,408	71,651	110,188		2,231	15,196
1976	6,166	17,934	78,171	107,998		1,717	14,918
1977	5,864	17,209	69,023	100,818	970	1,873	14,511
1978	5,435	15,374	64,382	87,508	646	1,949	18,116
1979	5,376	16,492	62,916	107,221	498	1,919	22,236
1980	5,333	16,083	56,912	110,653	869	1,606	22,209

1. Personal correspondence. William R. Tuten, Patient Administration Division, Office of the Surgeon General, Department of the Army, 11 February 1982. Note: data sources differ for periods 1964-66, 1971-78, and 1979-80.

2. Personal correspondence. Fred E. Hammer, Information Systems Division, Office of Civilian Health and Medical Program of the Uniformed Services, August 25, 1981.

late 1960s and early 1970s and then a shift back to Tripler, reducing community hospital use. Table 2 presents the available data on military and non-military use of Tripler for 1964-1980 and CHAMPUS use for 1974-1980. Civilian use of Tripler is substantial, with about 16,000 admissions and over 100,000 patient days per year, which is roughly 15-20 percent of the volume experienced by all community hospitals in the state. Thus, if substantial utilization shifts occurred, they could markedly influence the statewide patterns. Dispositions, which roughly correspond to discharges, are relatively constant throughout the period, although patient days for active duty personnel show the anticipated increase and decrease with the Vietnam War. (Data for 1967-70 are unavailable.) Non-military use, however, remained relatively constant, suggesting that the increased military demand was met by expansion in effective capacity, rather than by shifting civilians to community hospitals. (From 1960 to 1970 Tripler reported set up and staffed 1000 beds in the AHA Guide Issues. This capacity subsequently was reduced to 750 by 1973 and 540 by 1975. The constant figure in the 1960s may have reflected available rather than staffed beds.) The CHAMPUS figures indicate a growth in use of community hospitals since the mid-1970s, but this is unlikely to be because of growth in military use. A General Accounting Office report indicates that much of this use is for mental health care for which Tripler has insufficient capacity. (The sharply rising average stay for the CHAMPUS admissions supports this explanation.) More importantly, the increases in CHAMPUS use of about 2-3,000 days per year are trivial relative to statewide increases of 15-50,000 patient days.

In 1974 a law was passed mandating health insurance coverage for most workers effective January 1, 1975 (Skolnik, 1975). It is estimated that between 1974 and 1977 the proportion of the population without coverage, either private, Medicare, Medicaid, or CHAMPUS for military dependents, fell from 4.7 percent to 1.8 percent (Van Steenwyk and Fink, 1978). The expansion in enrollment was relatively small primarily because few people were not covered prior to the Act. Furthermore, the benefits mandated by the Act were those included in the most popular group plans offered by Kaiser and HMSA, so there probably was no major upgrading involved. Thus, the compulsory health insurance coverage in the state is unlikely to be a major explanatory factor in length-of-stay patterns.

In 1970 HMSA began an aggressive program of claims denial for what were considered excessive stays. Within a year this had a major impact on the appropriateness of diagnosis-specific stays in five hospitals under study (Payne and Lyons, 1972). (Similar reductions were not seen for Kaiser Foundation Hospital, which would not be affected directly by HMSA policies.) It would appear that HMSA was more successful in applying this program to Medicare and Medicaid beneficiaries, for whom it is the financial intermediary, than to its own group enrollees, who show a constant length of stay from 1970 to 1973. This inconsistency will be discussed in more detail below.

There is some evidence that one method used by HMOs to reduce the hospital costs of their members is the substitution of "do-not-admit" or "come-and-go" surgery for relatively minor procedures which traditionally

would result in a hospital admission (Marks et al., 1980). Such admissions normally would have a very short length of stay, so the spread of "come and go" surgery would tend to reduce the admission rate and lengthen the average stay for those who are admitted. Statistics on the prevalence and growth of such practice patterns are unavailable, but a rough indicator may be the ratio of surgical operations per hospital admission. Two sets of data having different inherent biases are available. The Hospital Discharge Survey (HDS) of the National Center for Health Statistics is based on a sample of hospital discharges and includes information concerning surgical operations on those patients. (Through 1979 only the three most important procedures were listed.) As may be seen in Table 3, nationally the number of operations per discharge rose between 1971 and 1974 and has remained relatively constant at about .58 since then. Because the HDS is based upon discharged patients, it excludes patients who were operated upon but were not admitted. Had such patients been admitted, they would have had an operation/discharge ratio of at least 1.0, so their exclusion will lower the observed ratio. The American Hospital Association's annual survey has since 1971 reported the number of surgical operations in community hospitals as well as total admissions. The AHA figure should include all operations in the operating room, irrespective of the patient's admission status. An increase in "come and go" surgery will keep constant the numerator of this operations/admissions ratio while reducing the denominator, thus increasing the resultant ratio. For the U.S. totals, the AHA figures indicate a slow increase in

Table 3

Surgical Operations in Community Hospitals, U.S. and Hawaii

	U.S. - Hospital Discharge Survey[1]		American Hospital Association - Community Hospitals[2]			
			U.S.		Hawaii	
	Operations per Discharge	Operations per 1000 Population[3]	Operations per Admission	Operations per 1000 Population[3]	Operations per Admission	Operations per 1000 Population[3]
1971	.536	77.0				
1972	.548	83.5	.481	72.1	.611	69.7
1973	.574	87.1	.486	73.6	.627	68.3
1974	.584	91.1	.493	76.5	.625	65.9
1975	.589	93.9	.498	78.2	.626	68.2
1976	.584	93.1	.495	78.9	.640	70.4
1977	.589	97.0	.500	78.6	.666	74.7
1978	.583	94.2	.497	77.9	.625	68.0
1979	.580	95.6	.521	81.9	.726	78.7
1980			.519	83.2	.693	75.7

1. U.S. Hospital Discharge Survey for Short-Stay, non-Federal hospitals in the U.S., excluding newborns. Data are from the U.S. National Center for Health Statistics, Vital and Health Statistics, Series numbers 17, 18, 24, 26, 31, 37, 41, 46, 60, and Monthly Vital Statistics Report 23:7 (Supplement 3), Oct. 17, 1974, "Surgery in Short-Stay Hospitals: United States, 1972."

2. American Hospital Association. Hospital Statistics, annual.

3. U.S. Bureau of the Census. "Preliminary Estimates of the Population of States: 1970-1980," 1981 and Hawaii State Department of Planning and Economic Development, Hawaii State Data Book, 1980 Edition.

operations/admission throughout the period, perhaps reflecting an increased use of "come and go" surgery.*

Only the AHA data are available for Hawaii. While the ratio of operations per admission are much higher than is the case nationally, the increase during the decade is even more pronounced, especially during the last half of the 1970s. Simultaneously, the ratio of operations per 1000 population is 5-14 percent lower than the national average, suggesting that the higher operations/admissions ratio is the result not of a high surgery rate but of a low admission rate. As discussed earlier, the age-sex composition in Hawaii could account for a 4-7 percent lower admission rate, which is consistent with the surgical utilization; however, the admission rate in Hawaii by the late 1970s was about 30 percent below the national average. Either medical admissions are far below the national pattern, or an above average proportion of surgery in Hawaii is performed without admission to the hospital. The latter seems more likely to be the case.

While increases in the use of "come and go" surgery may partially explain the changes in admissions and length of stay in Hawaii during the late 1970s, there is still no good explanation as to why the patterns in Hawaii are more extreme than for the country as a whole. However, a plausible hypothesis for this pattern can be derived from research on the diffusion of medical innovations. The long term shifts in the national

*The HDS and AHA figures for total admissions are comparable, but the HDS consistently reports more surgical operations. This may be a reflection of the use by the HDS of discharge abstracts, which may be more likely to report incidental procedures (e.g., an appendectomy incidental to a cholecystectomy) while the AHA data may be limited to primary procedures or counts of reasons for which the operating room was scheduled.

figures probably reflect changing case mix and treatment approaches, which diffuse slowly among practitioners. (For instance, the increase in average stays during the 1960s predated Medicare and Medicaid.) The decline in average stay during the last decade may reflect the marked change in treatment for heart attack patients, outpatient therapy for malignancies, and other stay-reducing innovations. The introduction of such innovations typically takes place over several years, but certain factors, such as the influence of opinion leaders and practice in multispecialty groups, seems to hasten adoption (Coleman, Menzel, and Katz, 1959). The smallness of Hawaii allows frequent interaction among practicioners and may increase the pace at which innovation diffuses. More importantly, in 1975 over 40 percent of Hawaiian physicians practiced in groups, which is among the highest percentages in the nation, and 92 percent of these group physicians are in multispecialty or family practice groups in contrast to 65 percent nationally (Goodman, Bennett, and Odem, 1976). Thus, the special characteristics of a small island community combined with the powerful role of medical groups may lead to the more rapid and more universal adoption of changes in practice.

To summarize this discussion, it appears that the overall use of community hospitals in Hawaii exhibits some marked differences from the nation as a whole. The U.S. figures show a steadily increasing rate while the Hawaii figures show a steady decrease. Both the U.S. and Hawaii exhibit cyclical patterns in average length of stay, with nearly the same peaks and troughs, but the swings in the Hawaii figures are more than twice as large. Changes in age-sex composition may account for some of these

differences. While long-term beds account for a substantial fraction of the patient days in short-term hospitals in Hawaii, they do not seem to have influenced the length-of-stay pattern other than by increasing the average. Civilian use and non-use of Tripler Army Hospital has had little impact on these trends. Similarly, mandatory health insurance coverage can probably explain little of the effects. Active utilization review by HMSA in the early 1970s followed by increasing use of "come and go" surgery may help to explain the fall in average stays in the early 1970s and their subsequent rise. The major role of multispecialty groups in Hawaii may help cause the wide swings (relative to the U.S. total) in average stay if practice patterns shifted rapidly and much more universally than on the mainland. In the next section we will examine these changes in more detail to see whether they can be reasonably attributed to competition.

Hospital Use Patterns and Cost Containing Competitive Effects

The preceding discussion suggests that the patterns of hospital use over the past quarter century for all Hawaiian residents show little direct evidence of a cost-containing or hospital use reducing competitive effect from Kaiser's entry. However, the data are sufficiently fragmentary that it is impossible to rule out a competitive effect, so to further examine the hypothesis, we will review more recent data for HMSA and other enrollees. Figures 4 - 6 and Table 4 present the data for admissions and patient days per 1000 and length of stay for various enrollee groups in Hawaii for the 1974-80 period. The limited availability of data for certain series restricts the analysis to this period. This restriction is

Table 4

Enrollment and Utilization Estimates by Health Plan,
Hawaii, 1974-1980

	STGOS-AHA (000's)	Acute SHPDA	HMSA Basic Group	HMSA Community Health Plan	Kaiser < 65	Medicare Aged & Oisabled	Medicaid excl. Aged & Oisabled	CHAMPUS	Non Medicare Medicaid (AHA)	Non Medicare Medicaid (SHPDA)
Population -										
1974	809.5[1]	809,500[1]	395,907[4]	12,501[4]	90,335[6]	58,321[7]	74,549[7]	68,300[10]	676,630[11]	676,630
75	825.1	825,100	414,404	19,100	92,446	61,316	n.a.	63,700	678,692*	678,692
76	844.2	844,200	422,870	22,102	95,087	64,410	99,037	67,000	680,753	680,753
77	859.5	859,500	446,233	23,260	97,239	68,160	85,303	65,000	706,037	706,037
78	870.7	870,700	451,727	23,926	100,973	71,982	90,930	61,100	707,788	707,788
79	892.1	892,100	461,377	27,118	104,558	75,840	91,057	64,500	725,203	725,203
80	908.7	908,700	460,871	35,650	105,831	n.a.	n.a.	64,000	737,700**	737,700**
Oays/1000										
1974	727[2]	n.a.[3]	442	371[5]	359	2,709[8]	816	226[11]	547	n.a.
75	753	641	404	392	340	2,870	n.a.	239	578	424
76	758	630	398	415	328	2,453	650	223	612	455
77	802	650	360	419	322	2,656	670	223	638	454
78	794	655	336	433	309	2,778	597	297	617	447
79	813	667	339	379	295	2,677	582	345	646	467
80	815	656	335	n.a.	296	n.a.	n.a.	347	654	460
Adm/1000										
1974	105	n.a.	86.6	n.a.	66	291[8]	175	29	82	n.a.
75	109	114	85.9		64	285	n.a.	35	86	91
76	110	108	82.9		63	272	143	26	90	87
77	112	110	76.6		65	273	149	29	92	90
78	109	109	73.0		64	274	139	32	88	88
79	108	108	67.8		62	264	137	28	88	88
80	109	110	69.8	n.a.	61	n.a.	n.a.	25	89	90
LOS										
1974	6.90	n.a.	5.1	n.a.	5.4	9.3[8]	4.7	7.7[11]	6.7	n.a.
75	6.91	5.65	4.7		5.3	10.1	4.8	6.8	6.8	4.7
76	6.89	5.84	4.8		5.2	9.0	4.6	8.7	6.8	5.2
77	7.14	5.89	4.7		5.0	9.7	4.5	7.8	6.9	5.1
78	7.30	6.03	4.6		4.8	10.1	4.3	9.3	7.0	5.1
79	7.50	6.18	5.0		4.8	10.1	4.3	11.6	7.3	5.3
80	7.50	5.98	4.8		4.9	n.a.	n.a.	13.8	7.4	5.1

Notes, Table 4

1. State civilian resident population. Hawaii State Data Book, 1980 edition.

2. American Hospital Association, Hospital Statistics, annual 1975-1981.

3. Hawaii State Health Planning and Development Agency, annual reports and summary tables.

4. Christianson, 1978, for 1974-1976. Paul Yamashita, HMSA, personal correspondence, May 18, 1981, for 1977-80.

5. Paul Yamashita, HMSA, personal communication, 5/18/81.

6. Jonathan Gans, Kaiser, personal correspondence, 1/15/82.

7. Medicare Hospitalization enrollment as of July 1. U.S., SSA, ORS. Medicare, Health Insurance for the Aged and Disabled, 1974, Section 2: Enrollment, 1977 (SSA) 77-11705; U.S., HFCA, OPPR, Medicare, Health Insurance for the Aged and Disabled, 1975, Section 2: Enrollment, 1978 (HFCA) 062 (11-78); U.S. HCFA, ORDS. Medicare: Persons Enrolled in the Health Insurance Program, 1976-1977, 1981 (HCFA) Pub. No. 03076. U.S. HCFA, ORDS. Medicare: Health Insurance for the Aged and Disabled, 1978 and 1979: Reimbursement by State and County. HFCA Pub. No. 03106, June 1981.

8. Medicaid hospital use estimated from several sources. See Table A-3 (Appendix).

9. Medicare enrollment is based on unduplicated counts of persons receiving medical care through Title XIX, excluding those aged 65 and over and those eligible for aid to the permanently and totally disabled. Data are from U.S. and DHHS Hawaii State worksheets. The number of recipients per year seems to vary substantially, but the numbers of hospital admissions and days follow a fairly smooth trend.

10. Military dependents in Hawaii, Hawaii State Data Book, 1980 edition. 1980 figure is an estimate for July 1 based on April 1 Census data.

11. CHAMPUS hospital use excludes services paid for by private insurance. Source of data, Fred E. Hammer, Chief, Information Systems Division, Office of CHAMPUS, personal correspondence, August 25, 1981. Note: 1980 data are probably understated due to claims lag.

Figure 4

Patient Days/1000, Selected Populations

Hawaii, 1974-1980

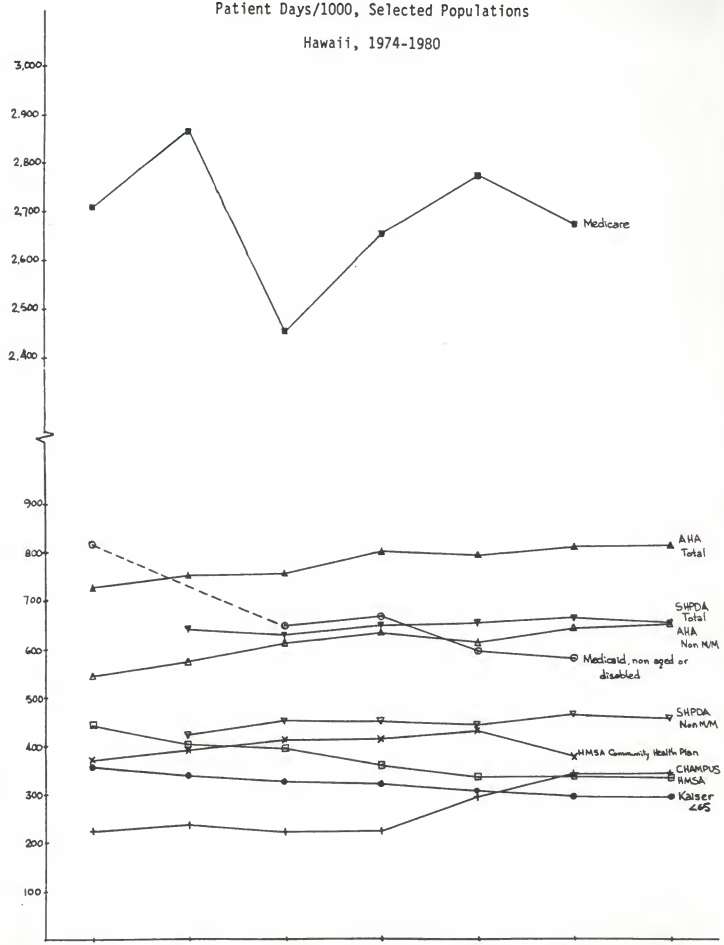


Figure 5

Admission Rates/1000, Selected Populations

Hawaii, 1974-1980

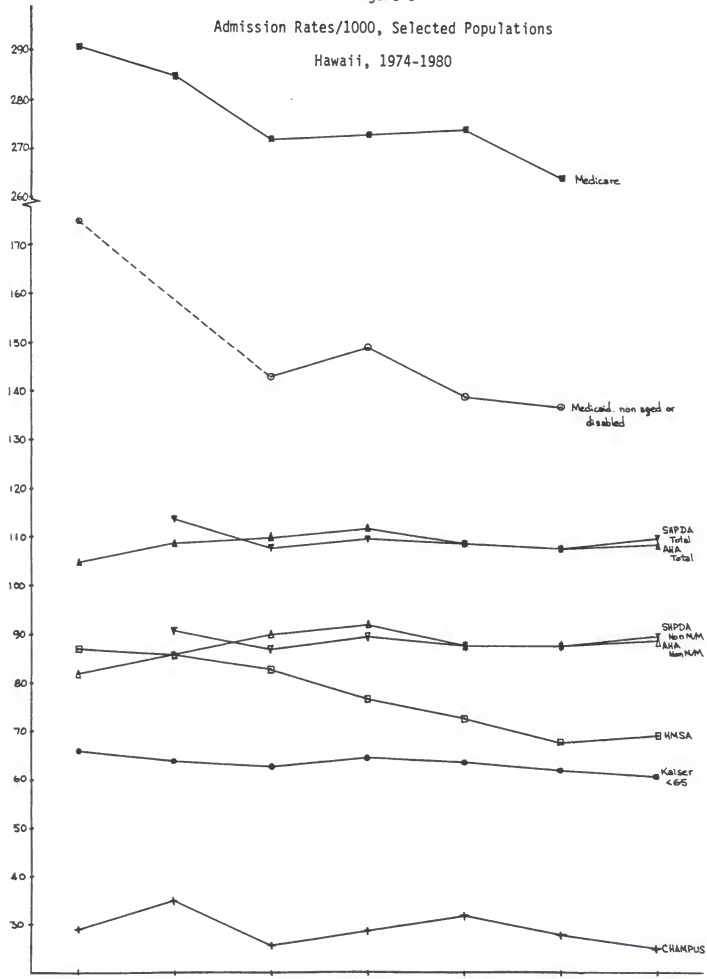
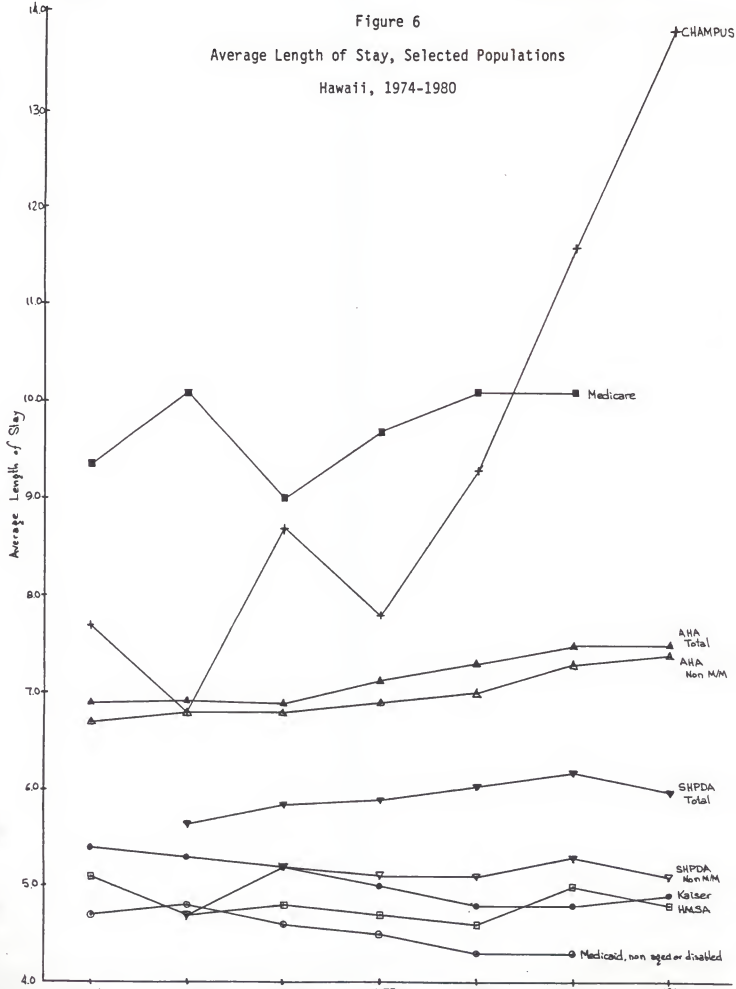


Figure 6

Average Length of Stay, Selected Populations

Hawaii, 1974-1980



not a major problem because the period since 1974 incorporates the most important anomoly in the Hawaii data: the continued sharp decline in HMSA and Kaiser use in contrast to the increase in total patient days (See Figures 1-3).

There are several possible explanations for the decline in hospital use for HMSA and Kaiser. These include (1) the results of cost containing competitive reactions to each other, (2) increasing duplicate enrollment, which inflates denominators and biases downward utilization statistics; (3) other, externally determined factors. If competition results in utilization constraints on HMSA and Kaiser enrollees, this could (a) have a similar cost containing effect on others, such as Medicare and Medicaid beneficiaries, through a change in physician practice patterns, (b) have no effect on others; (c) lead to an increased use of services for others as physicians and hospitals try to compensate for the lost revenue.

Duplicate health insurance coverage, usually as a result of families with two or more workers, each of whom receives employer-sponsored coverage, is increasing nationally and creates important difficulties in the analysis of carrier-based utilization data (Luft, 1981), There are several reasons duplicate coverage must be considered as a potential explanation for the Hawaii case. Hawaii has the highest proportion in the U.S. of working wives (U.S. Bureau of the Census, 1978), and there are a substantial number of people with two or more jobs. More importantly, the dominant role of HMSA and Kaiser make the differing utilization patterns all the more suspicious. During the 1974-80 period, reported HMSA days per 1000 enrollees fell 18.3 per year or 4.1% while the comparable decline for

Kaiser enrollees was 10.6 days per year or 3.0%. In contrast, use in the state for all persons rose 15.0 days per year (2.1%), and use by non-Medicare or Medicaid beneficiaries rose 16.5 days per year (3.0%). (All figures are highly significant, see Table 5.) Yet during the 1974-1980 period, reported HMSA and Kaiser enrollment rose from 58 to 78 percent of the non-Medicare-Medicaid population. This means that if the HMSA and Kaiser utilization figures are accurate, there was a massive increase in hospital use by the remaining population. As shown in Table 4, estimated hospital days per 1000 persons not covered by Medicare, Medicaid, HMSA, Community Health Plan, or Kaiser rose from 889 in 1974 to 2,050 in 1979. If CHAMPUS enrollees are excluded in a similar fashion, the results are even more dramatic: a rise from 1,301 to 3,675 days per 1000 in five years.

One potential counter to this argument is that the hospital days figures include use by tourists, who are not included in the population denominators. Tourism in Hawaii increased markedly through the 1970s, and between 1974 and 1979 the average number of visitors present increased from 63,500 to 98,700 (Hawaii State Data Book, 1981). Of course, most tourists probably expect to be in good health, and there are no data on hospital use rates for visitors. One set of data, however, suggests that use by visitors is of relatively minor importance. Data for Medicare aged beneficiaries by location of hospital and place of residence for 1974-1978 indicate a 40 percent increase in admissions in Hawaii by out-of-state residents. Total patient days for these people, however, rose from about 7,000 to 7,600. Either figure is a trivial fraction of the patient days unaccounted for in Table 6 (142,622 or 248,641). Even adding several times the Medicare use rate would have little effect on the results.

Table 5

Trends in Utilization Rates by Health Plan, Hawaii, 1974-1980

	Days/1000			Admissions/1000			Average Length of Stay		
	Intercept	Trend	R^2	Intercept	Trend	R^2	Intercept	Trend	R^2
Community Hospitals - AHA	720.3 (71.3)***	15.00 (6.64)*	.90	107.6 (58.2)***	0.32 (0.78)	.11	6.68 (83.5)***	0.12 (6.00)**	.90
Acute Beds - SHPDA	625.3 (61.8)***	5.46 (2.60)	.63	112.5 (52.3)***	-0.60 (0.24)	.25	5.57 (42.9)***	0.08 (2.96)*	.69
HMSA - Basic Group	446.7 (35.9)***	-18.32 (6.59)**	.90	91.6 (50.0)***	-3.46 (8.44)***	.93	4.89 (30.6)***	-0.018 (0.50)	.05
HMSA - Community Health Plan	384.8 (16.2)***	4.77 (0.78)	.13	n.a.			n.a.		
Kaiser, <65 Enrollees	363.9 (85.2)***	-10.64 (11.08)***	.96	66.1 (70.4)***	-0.64 (3.05)*	.65	5.47 (60.8)***	-0.104 (5.20)**	.84
Medicare Aged & Disabled	2713.8 (18.7)***	-6.66 (0.18)	.01	293.3 (71.5)***	-4.74 (4.51**)	.84	9.25 (22.0)***	0.134 (1.24)	.28
Medicaid, exc. Aged & Disabled	836.1 (21.6)***	-45.54 (4.89)*	.89	175.9 (20.4)***	-7.19 (3.47)*	.80	4.89 (62.7)***	-0.103 (5.15)*	.87
CHAMPUS	178.7 (7.0)***	23.18 (4.07)**	.77	32.0 (11.3)***	-0.71 (1.11)	.20	5.31 (5.0)**	1.02 (4.28)**	.79
Non Medicare/Medicaid (AHA)	547.1 (39.1)***	16.50 (5.27)**	.85	84.6 (34.5)***	0.82 (1.49)	.31	6.51 (86.8)***	.12 (6.94)***	.91
Non Medicare/Medicaid (SHPDA)	424.3 (33.6)***	5.97 (2.27)	.56	89.5 (45.4)***	-0.11 (0.27)	.02	4.79 (22.8)***	0.07 (1.50)	.36

Notes, Table 5

These regressions are based on the data in Table 4, using ordinary last squares in the following equation: Y = Intercept + Trend * Time, where Time takes the values 1974 = 1, 1975 = 2, . . . 1980 = 7. Values in parentheses are t-ratios, and significance levels are computed using a two-tailed test.

* = p .05

** = p .01

*** = p .001

n.a. = not available

Table 6

Hospital Days and Admissions Not Accounted for by Major Health Plans
in Hawaii, 1974 and 1979

	1974			1979		
	Population*	Hospital Days	Admissions	Population	Hospital Days	Admissions
State total	809,500	589,001	85,371	892,100	725,213	96,664
less:Medicare/Medicaid	(132,870)	(218,852)	(30,025)	(166,897)	(256,526)	(32,513)
HMSA	(395,907)	(174,990)	(34,286)	(461,337)	(156,407)	(30,627)
CHP	(12,501)	(4,638)	(909)**	(27,118)	(10,278)	(2,013)**
Kaiser	(90,335)	(32,430)	(5,962)	(104,558)	(30,845)	(6,483)
subtotal	177,887	158,091	14,189	132,150	270,877	25,028
less: CHAMPUS	(68,300)	(15,469)	(2,005)	(64,500)	(22,236)	(1,919)
Total residual	109,587	142,622	12,184	67,650	248,641	23,109

*Population/enrollment estimates assume no duplicate coverage.
**Admissions or length of stay are not available for CHP enrollees, so HMSA length of stay is used to estimate admissions.

Sources: See Table 4.

Table 7 presents estimates of enrollment in various plans. By 1974 the number of enrollees exceeded the state population without making allowances for persons without coverage or coverage through employers on the mainland. Enrollment continued to grow more rapidly than population through the 1970s, resulting in increasing duplicate coverage and deflated utilization rates. However, the growth in duplicate coverage is not nearly enough to explain the decline in hospital use--and especially admissions--by HMSA members. Nearly two-thirds of the overall decline in use by Kaiser members is attributable to reductions in length of stay, which is not affected by errors in enrollments. On the other hand, nearly all of the decline in HMSA use is caused by a falling admission rate.

The difficulty with the existing data is demonstrated in Table 6. Between 1974 and 1979 the number of patient days not accounted for by Medicare, Medicaid, HMSA group enrollees, Community Health Plan, Kaiser, or CHAMPUS grew by 74 percent, from 142,622 to 248,641, and residual admissions nearly doubled, from 12,184 to 23,109. Yet enrollment in commercial insurance plans seems to have grown only slightly, and non-group enrollment in HMSA fell. Simultaneously, Hawaii's mandatory health insurance law further reduced the already small number of people without any coverage (Van Steenwyk and Fink, 1978). Several explanations, some of which are more plausible than others, exist for the increasing residual. One is that hospital use by people with commercial coverage is increasing very rapidly. This may be rejected because benefits paid by commercial carriers have been rising more slowly than for HMSA. (Health Insurance Association of America, 1975-82.) A second explanation is that a small

Table 7

Health Plan Enrollment - State of Hawaii, 1974-79

	Non Medicare-Medicaid Civilian Resident Population (1)	HMSA			Kaiser (5)	Sugar Industry Self-Insure (6)	Major Medical Commercial Insurers (7)	CHAMPUS (8)	Total Enrollment (2-8) (9)	Ratio of Enrollee to Eligible (10)
		Basic Group (2)	Basic Non Group (3)	Community Health Plan (4)						
1974	676,600	395,907	24,568	12,501	90,898	25,000	74,000	68,300	691,174	1.022
1975	678,700	414,404	21,468	19,100	93,993	20,000	67,000	63,700	699,665	1.031
1976	680,800	422,870	19,486	22,102	96,181	18,000	74,000	67,000	719,639	1.057
1977	706,000	446,233	17,726	23,260	98,296	17,000	78,000	65,000	745,515	1.056
1978	707,800	451,727	18,648	23,926	103,650	14,800	85,000	61,100	758,851	1.072
1979	725,200	461,377	18,177	27,118	105,466	13,800	81,000	64,500	771,438	1.064

Notes, Table 7

1. See Table 4.

2 - 4. HMSA enrollments from Robert Nickel, HMSA. Personal correspondence, November 2, 1981.

5. Kaiser year-end enrollments, excluding Medicare and Meidcaid, from Jonathan Gans, Kaiser. Personal correspondence, January 15, 1982.

6. Sugar industry enrollments, excluding companies underwritten by Kaiser and HMSA, but including some over-65 enrollees, Robert Nickel, HMSA.

7. Persons under age 65 with major medical insurance from commercial insurance companies. Health Insurance Association of America Source Book, annual. For the last two years data for persons with hospital insurance have been published. These figures indicate enrollment of about 140,000. Using the time series of insurance company and BC/BS and other benefits, it appears that the growth in commercial coverage from 1974-79 has been relatively low, supporting the major medical enrollment series.

8. See Table 4.

subgroup of the medical population, that is, people without commercial coverage, account for the increased use. Yet the hospitalization rates implicit for such a subgroup would be enormously high because of the small denominator. A third, and most plausible explanation, is that some of the data for the major plans are in error. As noted earlier, the AHA and SHPDA figures are reasonably consistent once an adjustment is made for long-term days in short-term hospitals.* Thus, the total figures are probably correct unless there is a major problem in the way hospitals are reporting their data to both sources. The other utilization figures generally represent paid days, and thus will exclude care for which payment was denied. Medicare data indicate that over 94 percent of all days of care in Hawaii are covered, and this has remained relatively constant (U.S. HCFA ORDS, 1981). Furthermore, denial of payment is unlikely to affect admissions nearly as much as patient days. Similarly, Kaiser estimates that its utilization statistics are understated by about six percent due to covered services at non-Kaiser hospitals. In any case, to explain the observed residuals, the rate of denials or uncovered admissions must have increased dramatically.

To place the problem in perspective, HMSA is clearly the largest single carrier in the state, yet the increase in residual admissions is more than a third of the HMSA total. Since no one has pointed to a major increase in use by any particular group, at least a substantial part of the

*Because it is not known how many long-term care days are included in the utilization statistics, especially the Medicare and Medicaid figures, the AHA data have been used as the base in this discussion. The results would be similar using the SHPDA figures, especially in the analysis of admissions in which the AHA and SHPDA data are nearly identical.

residual's growth is probably attributable to problems in the data. These problems are probably in the HMSA figures if only because changes of this order of magnitude in any of the other data sets would be even more noticeable. With the exception of Medicare and Medicaid, for whom HMSA is the intermediary, none of the other plans are nearly large enough to be able to account for a residual of this size. Furthermore, the rapid decline in HMSA admissions is suspicious, precisely because it is so large relative to the base rate. While the absolute declines in admission rates for Medicare and Medicaid enrollees are large, in percentage terms the Medicare decline is only 1.6% in contrast to 4.0% for HMSA. The decline for Medicaid enrollees is inflated by a very high admission rate in 1974, which may be an error. Another cause for suspicion is the utilization pattern for enrollees in Community Health Plan, the HMO sponsored by HMSA. Only total patient days are available for this group, but they show a steady increase from 1974 to 1978 followed by a decline in 1978. While this increase parallels the statewide figures, it is in stark contrast to the Kaiser and HMSA conventional coverage experience. Startup problems or adverse selection could account for the increase, but problems in the underlying data may also be at fault.

Given these problems in the underlying data, it is difficult to determine whether there are cost-containing or cost-shifting effects. Substantial shifting to Medicare or Medicaid does not appear to be occurring because both show significant declines in total utilization. The increase in use by CHAMPUS enrollees might be evidence of cost shifting, but almost all the increase is attributable to a sharply rising length of

stay, which probably reflects substantial mental health and chemical dependency use by a small number of people. The General Accounting Office report on Hawaii noted that this was the major area of capacity shortage at Tripler (U.S. General Accounting Office, 1978). If, however, all the available figures are correct, then massive increases in utilization are being experienced by the relatively small number of people enrolled by commercial insurers (for which there is no evidence), by tourists, or by the infinitesmal number of uninsured. If this is true, it might imply some significant cost shifting. On the other hand, it is impossible to determine whether the falling utilization rates for Medicare and Medicaid are a reflection of changing patterns for HMSA enrollees because the true utilization rates are in question.

In the case of a cost-containing competitive effect in Hawaii, there appears to be a hung jury. The long term trends provide equivocal evidence concerning the role of Kaiser. Overall hospital use in Hawaii is certainly low relative to U.S. averages, but utilization patterns are dominated by a 25-year-long declining admission rate in Hawaii in contrast to increases nationally. Age, sex, and ethnic factors probably underlie much of this difference. There are no obvious changes in the patterns following Kaiser's entry. Cyclical patterns in length of stay are much more pronounced in Hawaii than for the U.S. as a whole. It is difficult to see why this would be directly related to Kaiser, although the major role of multispecialty group practices in general in Hawai may be a factor in causing more rapid adoption of new practice styles. In fact, the long history of medical groups and the plantation medical clinics may have made

Hawaii a conducive environment for Kaiser, rather than Kaiser's having had a major impact on Hawaii. The medical care system in Hawaii is distinctive and may have important lessons for the mainland, but it seems premature to identify a cost-containing response to HMOs as one of those lessons.

Table A-1

Hospital Use in Hawaii by Medicare Beneficiaries, 1973 - 1979

	All Inpatient Facilities - Admissions[1] (Fiscal Year ending June 30)			Short Stay Hospital Discharge[2] (Calendar Year)	Short Stay Hospital Discharges - Hawaii, Guam, Other (Calendar Year)[3]			Estimated Short Term
	Aged	Disabled	Total	Aged Beneficiaries	Aged	Disabled	Total	Aged & Disabled CY[4]
1973	14,267	-	14,267	-				13,800
1974	15,016	2,000	17,016	14,050				17,000
1975	15,026	2,001	17,027	14,675				17,500
1976	15,779	2,011	17,790	14,650	16,035	1,918	17,953	17,500
1977	16,519	2,221	18,740	15,870	16,843	2,286	19,129	18,600
1978				17,060	17,698	2,501	20,199	19,700
1979					17,610*	2,593*	20,203*	20,000

	All Inpatient Facilities - Covered Days[1]			Short Stay Hospitals	Short Stay Hospitals, Hawaii, Guam, Other[3]			Estimate Short Stay Hospitals
	Aged	Disabled	Total	Aged	Aged	Disabled	Total	Aged & Disabled[4]
1973	136,577	-	136,577	-				132,000
1974	142,655	15,601	158,256	144,340				158,000
1975	151,768	19,007	170,775	141,580				176,000
1976	143,596	16,895	160,491	134,300	152,977	17,076	170,053	158,000
1977	161,888	20,874	182,762	152,880	167,259	20,826	188,085	181,000
1978				172,995	182,704	22,870	205,574	200,000
1979					180,678*	24,837*	205,515*	203,000

*These data are less complete than earlier years because of billing and processing lags.

Notes, Table A-1

Sources:

1. U.S. Health Care Financing Administration, Office of Research, Demonstration, and Statistics. Medicare: Health Insurance for the Aged and Disabled, Selected State Data, 1973-1977. Washington, D.C.: USGPO, HCFA Pub. No. 03059, 1980. These fiscal year data are derived by multiplying January 1 enrollment by the admission rate. Patient days are computed by multiplying admissions by covered average length of stay in short-stay hospitals. This will result in an underestimate of total covered days because length of stay in long-stay hospitals in Hawaii averages 30.5 days in 1977, more than three times the average stay in short-stay hospitals. However, long-stay patients accounted for only 380, or only 2 percent, of all discharges. See U.S. Health Care Financing Administration, "Medicare: Use of Long Stay Hospitals, 1977," Health Care Financing Notes.

2. U.S. Health Care Financing Administration, Office of Statistics and Data Management "Medicare Patient Origin Data," unpublished tables. These data present the distribution of short-stay hospital discharges and days of care of Medicare beneficiaries aged 65 and over by place of occurrance and place of residence. Data are based on a 20 percent sample of beneficiaries and reflect hospital bills received and processed as of March of the following year. This short follow-up period probably results in a consistent downward bias.

3. U.S. Health Care Financing Administration, Office of Demonstrations and Statistics. Unpublished tables entitled, "Number of Discharges, Days of Care, and Mean Length of Stay for Short-Stay Hospital Discharges by PSRO and Year of Discharge, Hawaii, Guam, and Other," Quarter ending 038001.

4. Estimates of admissions are based primarily on the data from sources 1 and 3 because of the relatively short follow-up period used in source 2. The estimates are meant to reflect roughly patterns in use and are not precise. The days of care estimates are derived from the admissions estimates and length-of-stay data from sources 1 and 3, rounded to the nearest 1000 days.

Table A-2

Hawaii Medicaid Participants - Non Aged-Disabled

	Total	Money		Eligible, No Money		Not Eligible		>65	PTD	Others
		>65	PTD	>65	PTD	>65	PTD			
FY1972	71,668	2,985	2,534	-	-	2,810	739	5,795	3,273	62,600
1973	80,077	3,162	2,727	-	-	2,880	732	6,042	3,459	70,576
1974	85,699	3,427	3,191	355	111	3,172	894	6,954	4,196	74,549
1976	114,448	4,668	3,986	2,357	570	2,822	1,008	9,847	5,564	99,037
1977	102,268	4,820	4,620	2,593	769	2,991	1,172	10,404	6,561	85,303
1978	109,067	5,055	4,887	2,735	804	3,285	1,371	11,075	7,062	90,930
1979	110,218	5,280	5,137	2,889	815	3,561	1,473	11,736	7,425	91,057

Table A-3

Non Medicare-Medicaid Length of Stay - Hawaii 1974-1980

	Admissions						Non Medicare-Medicaid LOS			
	Medicare & Medicaid		Non Medicare-Medicaid							
			STGOS - AHA		Acute - SHPDA		STGOS - AHA		Acute - SHPDA	
	Gross	Net	M/M Gross	M/M Net	M/M Gross	M/M Net	M/M Gross	M/M Net	M/M Gross	M/M Net
1974	32,228	30,025	53,145	55,346	NA	NA				
1975	34,236	31,948	55,649	57,937	59,428	61,716				
1976	34,281	31,624	58,631	61,288	56,822	59,479				
1977	34,280	31,307	62,091	65,064	60,484	63,457				
1978	35,620	32,381	59,139	62,378	58,991	62,230				
1979	35,890	32,513	60,774	64,151	60,468	63,845				
1980	36,261	32,991	62,438	65,708	63,502	66,772				
	Patient Days									
1974	240,810	218,852	347,926	369,893	NA	NA	6.55	6.68	NA	NA
1975	259,900	240,784	373,375	392,491	268,912	288,028	6.71	6.77	4.53	4.67
1976	243,061	222,331	396,419	417,149	288,993	309,723	6.76	6.81	5.09	5.21
1977	262,355	238,118	426,138	450,375	296,022	320,259	6.86	6.92	4.89	5.05
1978	285,349	254,274	406,025	437,100	285,183	316,258	6.87	7.01	4.83	5.08
1979	293,528	256,526	431,685	468,687	301,751	338,753	7.10	7.31	4.99	5.31
1980	296,507	257,153	443,646	483,000	299,890	339,244	7.11	7.35	4.56	5.08

Source:

Annual worksheets submitted by the Hawaii Department of Social Services and Housing to DHEW and DHHS.

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Chapter 4

Rochester, New York*

Rochester, New York provides another recent example of a situation in which a falling hospitalization rate for Blue Cross-Blue Shield members has been attributed to HMO competition. In fact, a citizens' task force has recommended that substantial subsidies be given by Blue Cross-Blue Shield to the local HMO in recognition of the community-wide savings attributed to this competition. Yet, as will be seen below, other explanations for the observed decrease appear more plausible.

In 1973 three HMOs were started in Rochester with the support of the local Blue Cross-Blue Shield plan. The Genesee Valley Group Health Association is a prepaid group practice modeled after Kaiser and designed, in part, by Dr. Ernest Saward, former medical director of Kaiser-Portland. Enrollment in GVGHA has lagged somewhat behind projections, but it is now approaching breakeven with an enrollment of 41,000. One of the major problems faced by GVGHA is the low premiums of Rochester BC/BS, which enjoys a hospitalization rate and premiums well below that of other East Cost BC/BS plans (FLHSA, 1980). A second plan, Rochester Health Network (RHN) developed a network of contracting neighborhood facilities, many of them originally part of the Office of Economic Opportunity's Neighborhood Health Center program. RHN enrollment in 1979 was about 18,000, drawn primarily from lower income areas. The third plan, Health Watch, was sponsored by the Monroe County Medical Society and patterned after the San Joaquin Foundation for Medical Care. The plan involved 650 physicians, a majority of those in the area, and grew rapidly in the first two years to an enrollment of 24,000 by 1975 (FLHSA, 1980). A 60 percent premium increase in July 1975 resulted in a loss of almost 18,000 enrollees in six

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months, and the plan went out of business in 1976. (See Sorensen, Saward, and Wersinger, 1980, for a discussion of the reasons behind this decline.) A new IPA, the Rochester Area Health Maintenance Organization (RAHMO), began operation in November 1979 with about 200 contracting physicians.

Hospitalization Rates for Blue Cross Members and Others

Hospitalization rates and costs of the various HMOs and BC/BS plan in Rochester have undergone extensive study as part of a series of research projects. (See, for example, a list of 23 articles referenced in FLSHA, 1980). The Finger Lakes Health Systems Agency also established a Task Force on Prepaid Health Care which reviewed HMO performance and reported its findings and recommendations in January 1980 (FLHSA, 1980). One of the observations made by the Task Force was that the hospitalization rate of Blue Cross members was falling. Figure 1 presents the data for hospitalization by Blue Cross members under the age of 65. While one could view the data as showing a relatively continuous decline throughout the period, they are also consistent with a flat utilization rate from 1969 to 1972 followed by a period of marked decline from 1973, during which HMO enrollment grew markedly to over 46,000 enrollees. When presenting these data, the Task Force recognized that the downward trend was evident prior to the establishment of HMOs, but it emphasized that nearly half the total reduction occurred between 1974 and 1977. The Task Force went on to note that:

> In the absence of a clear mechanism linking the HMO presence to specific changes in physician practice patterns, the HMO impact must remain speculative. It is probable that a combination of factors has contributed to the overall decline

> One of these factors may well be the presence of alternative delivery systems which raise the price and cost containment consciousness of fee-for-service physicians. Other factors which may have contributed to the decline in Blue Cross (under age 65) hospital utilization include 1) successful efforts to control the number of hospital beds in the Rochester area, 2) more effective use and reimbursement for alternatives to hospital use such as home health care and ambulatory surgery, 3) indirect effects on physician hospital utilization practices from PSRO review of Medicaid and Medicare hospitalization, and 4) "no fault" reimbursement for some auto injury related hospitalizations (FLHSA, 1980, p. 68).

Even though the task force recognized the potential role of other factors in the apparent reduction in Blue Cross use, one of its principal recommendations was that further growth of GVGHA be encouraged, at least in part because of its salutary impact on costs for the community as a whole:

B. Recommendations and Rationale

1. GVGHA Loan and Rental Forgiveness

> The presence of GVGHA benefits the entire community, and it is, therefore, appropriate that the community as a whole, rather than present and future GVGHA members, share in the development and start-up cost of the program. In recognition of GVGHA's beneficial impact on the community, it is recommended that Rochester Blue Cross/Blue Shield forego rental charges on the Wilson Center and forgive the $3.3 million operating loan made to GVGHA between 1973 and 1975.

Since its inception, GVGHA has demonstrated significant reductions in hospital utilization when compared with the hospital utilization experience under standard Blue Cross and Blue Shield. This has been beneficial for GVGHA's members and the community. In 1978 GVGHA's lower use of hospital services resulted in total community payments for hospital services of $1.5 million. There is growing evidence nationally that the hospital utilization experience of prepaid group practices, such as GVGHA, can affect overall hospitalization rates by indirectly influencing the practice patterns of private fee-for-service physicians. The presence of GVGHA and its record of reducing hospital use is one of several factors contributing to the

> significant decline in hospital utilization rates which occurred in Rochester between 1974 and 1978. Many private physicians have responded to competition from GVGHA by participating in individual practice association type HMO plans. Because of these reasons, it is important that the viability of GVGHA be maintained (FLHSA, 1980, p. 10).

Given the strength and implications of this recommendation, it may be worthwhile to examine some of the evidence concerning the competitive impact of HMOs in the Rochester area. Because the Rochester Blue Cross/Blue Shield plan is by far the dominant private insurer in the area, one would expect that the pattern of falling utilization rates would be reflected in the figures for overall hospital use in that area. Table 1 presents several sets of comparison figures. The overall hospital utilization rates reported by FLHSA show an increase of 10 percent in contrast to the 12 percent Blue Cross decrease.* Moreover, even larger increases are apparent for the Medicare and

*Data from the American Hospital Association, while somewhat different, show the same trends. Total patient days from the two sources are shown below. Both data sets refer to the six counties of Livingston, Monroe, Ontario, Seneca, Wayne, and Yates. The AHA data are derived from annual editions of Hospital Statistics for the five counties of the SMSA. Hospital census data from Seneca county hospitals were added from the AHA Guide to the Health Care Field. FLHSA data were reported by the hospitals to the agency or its predecessor, the Genesee Region Health Planning Council. The consistently higher AHA figures are probably due to the fact that they relate to inpatient days in short-term hospitals while the FLHSA figures relate to patient days in acute care beds. Seven short-term hospitals in the six

	AHA	FLHSA
1973	1,040,835	962,259
1974	1,057,216	996,119
1975	1,092,792	988,244
1976	1,148,871	1,043,739
1977	1,132,842	1,036,727
1978	1,159,873	1,054,538
Increase	11.4%	9.6%

Medicaid populations, suggesting that indirect effects of PSRO reviews are unlikely to account for the Blue Cross decrease. These marked differences in patterns suggest that it may be inappropriate to rely entirely on the Blue Cross utilization figures. In order to develop a better understanding of what is really happening, we might first examine the underlying Blue Cross data.

Both the Hawaii and national data indicating diverging utilization trends in BC and AHA figures have been linked to increasing rates of duplicate health insurance coverage (Luft, 1981b). The large BC market share in Rochester and active efforts by local employers to eliminate duplicate enrollment suggests this may not be as important a factor in this case. It should be noted, however, that Blue Cross does not undertake a yearly head count of its enrollees. Instead, a "family factor" is applied to the number of family contracts to estimate total membership. If this family factor has not matched the decrease in average family size over time, enrollment estimates will overstate true enrollment and, thus depress utilization rates.

Table 2 presents detailed data concerning enrollment in Rochester Blue Cross during the 1970s. As can be seen in column 1, the family factor was dropped in 1972 from 2.70 to 2.52 and again in 1976 to 2.37. While the family size patterns are not readily available for Rochester, nationally there has been a reduction in average family size from 3.58 to 3.28 between 1970 and

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counties have long-term beds accounting for 111,000 to 128,000 patient days during the study period, and one long-term hospital has a short-term unit with about 16,000 acute care days per year. When these two adjustments are made, the series are reasonably close together, especially considering the fact that the FLHSA data refer to years ending December 31, while the AHA data use individual fiscal years, usually September 30 or June 30.

Figure 1

Rochester Blue Cross Inpatient Hospital Utilization
Medical Surgical Psychiatric Days/1,000 Person Per Year
1967-1978 (under age 65 only)

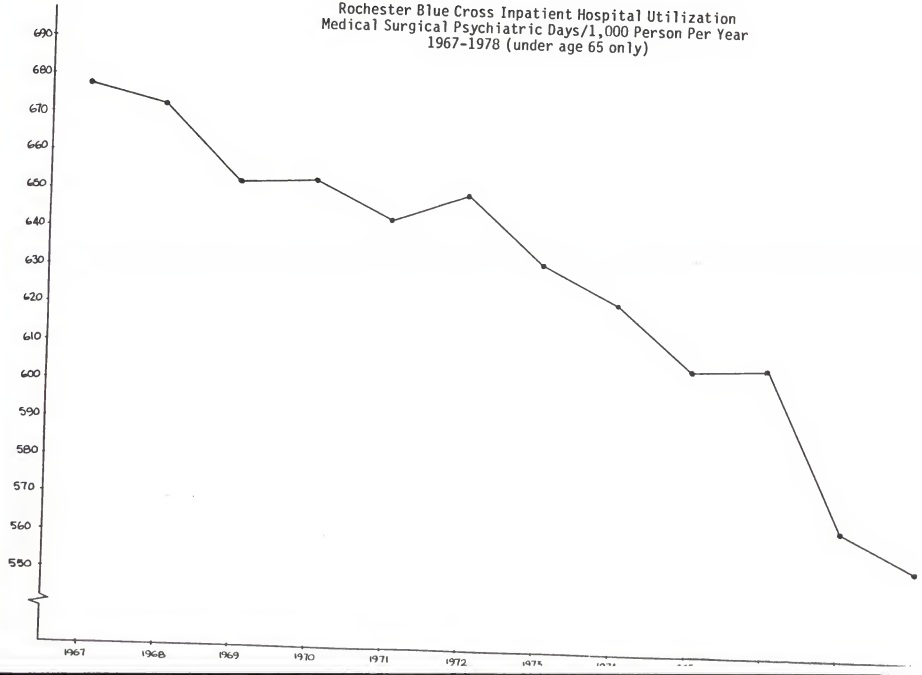

Table 1

Hospital Utilization Rates for Selected Populations
in the Rochester, N.Y. Area
1973-1978

	Blue Cross Medical/Surgical Days/1,000 Enrollees[1]		Acute Patient Days[2]	Medicare Aged Days of Care/1,000[3]	Estimated Medicaid Inpatient Days/1,000 Eligibles[4]
1973	632.6	(638.7)	982	n.a.	1,362
1974	622.9	(635.3)	1,017	2,935	1,610
1975	605.4	(623.7)	1,008	2,963	1,360
1976	606.8	(606.8)	1,063	3,139	1,477
1977	564.5	(569.5)	1,054	3,169	1,821
1978	554.3	(565.6)	1,071	3,247	1,909

Notes
Table 1

1. Includes only medical, surgical and psychiatric days; does not include maternity/nursery days because of partial coverage. Rochester Blue Cross' service area includes Livingston, Monroe, Ontrario, Seneca, Wayne and Yates counties. Source: Rochester Blue Cross, May 22, 1981. Figures in parentheses use adjusted enrollment base, see Table 2.

2. Days reported to FLHSA for medical/surgical, ICU-CCU, rehabilitation, maternity, pediatrics and mental health beds. Days are counted by service for 1973-75 and by actual beds occupied for 1976-78. Reporting period is year ending December 31. Area covered is Livingston, Monroe, Ontario, Seneca, Wayne, and Yates counties. The population denominator is based on intercensal estimates adjusted to be consistent with 1970 and 1980 final population counts. Sources: FLHSA, Table A, 1981; U.S. Bureau of the Census.

3. Days of care in hospitals in FLHSA for Medicare aged beneficiaries residing in Livingston, Monroe, Ontario, Seneca, Wayne, and Yates counties. Source: FLHSA, Table B, 1981. (See Appendix 1.)

4. Inpatient days for Medicaid recipients are not reported on a county basis. Expenditures for hospital services by county are reported by the state Department of Social Services. Expenditures for the six-county Rochester area (Livingston, Monroe, Ontario, Orleans, Wayne, and Yates counties) were then converted by dividing by the average cost per adjusted patient day for Rochester SMSA in the American Hospital Association's Hospital Statistics. Yearly Medicaid expenditures are divided by the average number of eligibles reported on December 31 of the year shown and the preceding year. (See Appendix 2.)

1980 (U.S. Bureau of the Census, 1982). (Note: 1.0 has to be added to the BC family factor to convert it to average family size.) If the family factors for 1972 and 1976 are assumed to be correct because they are based on concurrent surveys, then the family size of Rochester Blue Cross contracts are falling by about .04 persons per year. If this annual change were constnat throughout the decade, then a set of smoothly changing family ratios can be developed which range from 2.60 in 1970 (instead of 2.70) down to 2.21 in 1980 (instead of 2.37). Using these adjusted family ratios and the actual number of single and family contracts, an adjusted estimate of total enrollment is developed in the lower part of the table. The official figures range from 0 to 3.5 percent above these adjusted estimates. Applying this adjustment factor to the "official" Blue Cross utilization rates shown in Table 1 results in the figures shown in parentheses. While the downward trend is still apparent, the decline is smoother and lacks the "flat spot" for 1975-76 in the original data.

Even the revised enrollment figures may be hiding an increasing rate of duplicate coverage. Without population-based surveys it is impossible to measure accurately the prevalence of duplication, and indirect evidence is all that is available. One analysis of a segment of Rochester Blue Cross enrollment files shows a relatively constant ratio of contracts to contract addresses for 1972 and 1978 (Bozzette, 1980). While the author interprets this as evidence against an increasing duplication rate, it actually shows only that people have not been increasing the number of multiple policies obtained through Blue Cross. It may be the case that there is increasing duplicate coverage with commercial or other insurers. While such data are not

Table 2A

Enrollment in Rochester Blue Cross
1970 - 1979

	Group				Direct				Experience Rated		HMO Alternatives		Student
	Contracts		Family	Total	Contracts		Family	Total		Total		Total	Contracts
	Single	Family	Members	Members	Single	Family	Members	Members	Contracts	Members	Contracts	Members	Total Members
December 31,													
1970	60,405	149,651	404,058	614,114	11,232	10,649	28,753	50,634	32,105	92,111	-	-	9,568
1971	59,739	149,364	403,285	612,388	11,483	10,157	27,424	49,064	32,206	93,102	-	-	9,783
1972	63,839	154,291	388,814	606,944	11,396	9,527	24,008	44,931	38,450	98,202	-	-	9,709
1973	68,690	156,522	394,285	619,497	10,921	8,943	22,535	42,399	41,738	105,093	-	-	9,304
1974	72,334	157,707	397,421	627,462	10,800	8,049	20,283	39,132	36,485	89,307	12,359	33,292	9,200
1975	68,477	151,477	381,722	601,676	11,226	7,098	17,887	36,211	40,716	102,235	13,528	33,007	9,572
1976	69,040	147,672	349,983	566,695	11,489	6,311	14,957	32,757	41,555	100,890	4,346	9,903	9,880
1977	70,052	146,204	345,617	561,873	12,220	6,004	14,230	32,454	44,305	105,129	4,861	11,005	10,191
1978	74,747	144,302	342,473	561,522	12,530	5,743	13,668	31,491	46,492	111,254	6,341	13,887	10,141
1979	77,235	143,412	339,872	560,519	12,450	5,488	12,661	30,599	46,610	109,082	7,777	16,803	10,937

Source: Rochester Blue Cross, September 10, 1982.
Note: Under 65 contracts and members only.

Table 2B

Enrollment in Rochester Blue Cross
1970 - 1979

December 31,	BC Family Ratio	Adjusted Family Ratio	Experience Rated*		Total, Non-HMO Enrollment				Offical Unadjusted Total Members	Official/ Estimate
					Contracts		Adjusted	Total		
			Single	Family	Single	Family	Family Mem.	Members		
1970	2.70	2.60	9,881	22,224	91,086	182,524	474,562	748,172	766,427	1.0244
1971	2.70	2.56	9,652	22,554	90,657	182,075	466,112	738,844	764,337	1.0345
1972	2.52	2.52	14,739	23,711	99,683	187,529	472,573	759,786	759,786	1.0000
1973	2.52	2.48	16,597	25,141	105,512	190,606	472,703	768,821	776,293	1.0097
1974	2.52	2.44	15,524	20,961	107,858	186,717	455,589	750,164	765,101	1.0199
1975	2.52	2.40	16,304	24,412	105,579	182,987	439,169	727,735	749,694	1.0302
1976	2.37	2.37	16,519	25,036	106,928	179,019	424,275	710,222	710,222	1.0000
1977	2.37	2.33	18,641	25,664	111,104	177,872	414,442	703,418	709,647	1.0089
1978	2.37	2.29	19,166	27,326	116,584	177,371	406,180	700,134	714,408	1.0204
1979	2.37	2.25	20,251	26,359	120,873	175,259	394,333	690,465	711,127	1.0249

Source: Rochester Blue Cross, September 10, 1982.
Note: Under 65 contracts and members only.

Family ratio is the number of members on a family contract excluding the contract holder.

* Source data provided only total contracts (C) and members (M) on the assumption that the same family ratio (R) is used as for group and direct enrollment. Let S = number of single contracts and F = number of family contracts, then S + F = C and S + (1 + R)F = M. Then RF = M - C and F = (M - C)/R. For 1970, 2.70F = 92,111 - 32,105 or F = 22,224 and S = 32,105 - 22,224 = 9,881.

available, the falling Blue Cross membership in the face of a small increase in the area's population suggests either a growth in commercial coverage (or employer self-insurance) or a decline in the proportion of people with coverage. The substantial shift from family to single contracts evident in Table 2 may be a reflection of people's enrolling families in commercial plans and a second worker in Blue Cross. Multi-carrier duplication provides some additional financial coverage through coordination of benefits and substantial confounding of utilization rates (Luft, 1981b).

In the absence of clear evidence concerning increasing duplicate coverage, we must rely on speculation concerning its impact. Based on the declining enrollment in Rochester Blue Cross and the tightly knit employer community, it is unlikely that there are increases in duplicate coverage sufficient to explain the declining utilization rate. Before we examine other potential explanations, we should first ask whether a shift of enrollees to commercial plans, self-insurance arrangements, or HMOs could result in a change in enrollee mix that would reduce BC utilization. For this to occur, those people leaving Blue Cross would have had to be above average users of hospital care. Various studies of HMO enrollment situations, including several using Rochester data, indicate that early enrollees in prepaid group practices are below average users of hospital care (Roghmann, Sorensen, and Wells, 1978O; Luft, 1981a; Eggers and Prihoda, 1982). Rochester Blue Cross is unusual in that it provides a community rate for most of its enrollees, including groups. This means that an employee group with high utilization would probably face an increase in premium if it were to leave Blue Cross. The only groups having an incentive to self-insure or to seek commercial coverage are low utilizers.

The Back-up of Long Term Care Patients

What else, then, might explain the falling hospital use by Blue Cross enrollees? A partial answer, at least, is suggested by the Finger Lakes Health Systems Agency in its Task Force Report on the Hospital Back-up of Long Term Care Patients (1979). In brief, the fiscal crisis in New York led to some major revisions in the state Medicaid program in 1976-77. In March 1976, Medicaid rates were retroactively frozen at the 1975 levels, and the state attempted to shift certain costs on to the Medicare program by contesting eligibility (Spitz, 1981). Both aspects have made it more difficult for hospitalized patients to be transferred to long term care settings. For instance, in Monroe County there was a 15 percent decline in Medicaid SNF admissions in 1976 and another 24 percent decline in 1978 (FLHSA, 1979). The hypothesis is that these Medicaid and Medicare patients "backed up" in acute hospitals and took beds which otherwise would have been used by the under-age-65 Blue Cross enrollees.

In order to test the backup hypothesis, total hospital use by sepcific groups must be examined to see whether or not increases in use by Medicare and Medicaid beneficiaries offset declines in use by Blue Cross members. Unfortunately, the precise data are not readily available, and, therefore, various estimates must be used. Total use figures depend on both enrollment and utilization rate estimates. Table 4-3 presents the enrollment figures for various groups. While there may be some duplication in enrollment, such as Medicare-Medicaid crossovers, this will not affect the utilization estimates. Furthermore, Table 3 does not include people who have commercial or other health insurance nor the uninsured. Table 4 uses these enrollment estimates

Table 3

Enrollment in Various Types of Coverage
Rochester, NY
1973 - 1979

		Medicare[2]			Rochester HMOs[4]					
	Blue Cross Blue Shield Regular Members[1] (1)	Aged Enrollees (2)	Disabled Enrollees (3)	Medicaid Eligibles[3] (4)	GVGHA (5)	RHN (6)	Health Watch (7)	Subtotal Columns 1 - 7 (8)	Total Area[5] Population (9)	Ratio Column 8/9
1973	764,303	99,539	7,877	72,721	1,063	550	952	947,005	979,515	.967
1974	759,493	100,716	8,592	59,948	6,261	2,300	11,036	948,346	979,760	.968
1975	738,950	102,669	9,579	65,912	15,514	5,516	12,745	950,885	980,001	.970
1976	718,979	103,867	10,737	74,183	23,950	8,710	-	940,426	981,658	.958
1977	706,820	105,188	11,818	68,910	30,196	10,346	-	933,278	983,273	.949
1978	701,777	106,609	12,663	64,769	34,544	12,103	-	932,465	984,948	.947
1979	695,300	108,235	13,164	61,924	36,732	15,492	-	930,847	986,540	.944

All data refer to Livingston, Monroe, Ontario, Seneca, Wayne, and Yates counties.

Notes
Table 3

1. Regular BC/BS members are those without Medicare supplemental coverage. Data supplied by Rochester Blue Cross/Blue Shield, September 10, 1982. These data reflect the family factor adjustments shown in Table 2. Year-end figures are averaged to reflect average yearly enrollment.

2. FLHSA Table 4S2 and U.S. Social Security Administration, Medicare 1974 and 1975, Tables 1.18 and 1.19. U.S. HCFA, Medicare 1976, Tables 1.1.8 and 1.1.9; Medicare 1977, Tables 1.1.8 and 1.1.9; and Medicare 1978 and 1979, Reimbursements by State and County. Enrollments are as of July 1. 1973 Aged enrollment and 1973 - 1975 Disabled enrollments are estimated from SMSA data. See Appendix 3.

3. These are the number of persons authorized to receive Medicaid payments, which includes all public assistance cases and those authorized for Medical Assistance only. Data are supplied by New York State Department of Social Services. Year-end data were averaged to estimate mid-year enrollment.

4. Yearend enrollment figures were averaged to approximate mid-year estimates. GVGHA = Genesee Valley Group Health Association, RHN = Rochester Health Network. RHN figures exclude the Medicaid plan. Health Watch terminated its contract on July 1, 1976. Data are from the FLHSA Task Force Report, 1980, p. 111. See Appendix 4.

5. Population figures are estimates for the six-county region using final 1970 and 1980 Census counts, intercensal estimates, and standard Census Bureau techniques for revising intercensal estimates. See U.S. Bureau of Census, Preliminary Intercensal Estimates of the Population of States: 1970 - 1980.

these enrollment estimates and the comparable utilization rates to develop total patient days per year. In some cases the patient day figures are available directly).

While the data in Table 4 do not present a simple, unambiguous story, there are several patterns worth noting. The first is that a comparison of the patient days computed by summing the components is rising much more slowly than total days reported by Rochester area hospitals. For instance, column 7, which estimates hospital use by Medicare, Medicaid, Blue Cross, and HMO enrollees, increases from 911,593 to 925,213, a 1.5 percent increase between 1974 and 1978, while total medical/surgical and mental health days in area hospitals rose from 864,622 to 921,637, a 6.6 percent increase. (Column 7 probably exceeds column 8 because the latter excludes rehabilitation, maternity, and pediatric days, all of which are included in the Medicare/Medicaid figures. A comparison of column 9, which unfortunately does not include maternity and newborn days for Blue Cross, and column 10, comprising all acute days, shows a similar divergence: a 1.7 percent increase from the component figures versus a 5.9 percent increase for the total.) Several factors may explain the difference in these trends: increased out-of-area use by Rochester enrollees in the listed plans, increased duplicate coverage by such enrollees, or increased use of Rochester area hospitals by out-of-area residents. While all three factors may be at work, the Medicare aged data are based primarily on in-area use by residents, and the Medicare disabled data are a combination of residence and hospital-based figures. Medicaid estimates are derived from in-area expenditures. However, all three of these enrollment groups show substantial increases; the nearly flat totals are caused by the sharply declining number of hospital days used by Blue Cross enrollees.

Table 4
Hospital Days for Selected Populations in the Rochester Area
1973 - 1978

	Medicare Aged (1)	Medicare Disabled (2)	Medicaid (3)	Blue Cross Medical-Surgical (4)	HMO Medical-Surgical (5)	HMO Other Services (6)	Total Columns (1-5) (7)	FLHSA Medical Surgical Mental Health (8)	Total Columns (1-6) (9)	FLHSA Acute Days (10)
1973	n.a.	n.a.	99,043	488,160	n.a.	n.a.	n.a.	836,037	n.a.	962,259
1974	295,557	28,970	96,564	482,506	7,996	7,225	911,593	864,622	918,818	996,119
1975	304,172	32,742	89,658	460,883	17,557	10,694	905,012	879,865	915,706	988,244
1976	326,061	35,014	109,578	436,276	10,850	8,685	917,779	909,335	926,464	1,043,739
1977	333,373	38,352	125,477	402,534	11,615	9,478	911,351	901,203	920,829	1,036,727
1978	346,136	40,950	128,382	396,925	12,820	9,327	925,213	921,637	934,540	1,054,538
Annual Change										
1973-74	n.a.	n.a.	-2,479	-5,654	n.a.	n.a.	n.a.	28,585	n.a.	33,860
1974-75	8,615	3,772	-6,906	-21,623	9,561	3,469	-6,581	15,243	-3,112	-7,875
1975-76	21,889	2,272	19,920	-24,607	-6,707	-2,009	+12,767	29,470	+10,758	55,495
1976-77	7,312	3,338	15,899	-33,742	765	793	-6,428	-8,132	-5,635	-7,012
1977-78	12,763	2,598	2,905	-5,609	1,205	-151	13,862	20,434	13,711	17,811

Table 4
Notes

1. Days of care for Medicare aged beneficiaries in hospitals in HSA2 for residents of Livingston, Monroe, Ontario, Seneca, Wayne, and Yates counties from FLHSA. This series appears to approximate closely true use by all Medicare beneficiaries in hospitals located in Livingston, Monroe, Ontario, Seneca, Wayne, and Yates counties (See Appendix 1).

2. Days of care for Medicare disabled beneficiaries are from PSRO data for 1974 and 1975 and from hospital reimbursement data for 1976-79 (See Appendix 5).

3. Medicaid days of care are not routinely reported on a county basis. Medicaid expenditures for hospital care in the six-county area were obtained from the New York State Department of Social Services (May 28, 1982). These expenditure figures were divided by the average cost per adjusted patient day for the Rochester SMSA (which is composed of Livingston, Monroe, Ontario, Orleans, and Wayne counties), as reported in the AHA Hospital Statistics (See Appendix 2).

4. Rochester Blue Cross medical-surgical and psychiatric days for under-age-65 enrollees. These figures exclude obstetrical and nursery days. They were computed by multiplying average yearly enrollment (Table 2) and utilization rates per enrollee supplied by Rochester Blue Cross, May 22, 1981 (Table 1). Essentially identical utilization rates are published in the FLHSA Task Force Report, 1980.

5, 6. HMO utilization and enrollment estimates are outlined in Appendix 4.

7. The major difficulties in combining these data are that, while the Medicare data will essentially exclude nursery and obstetrical days--and thus be consistent with the Blue Cross figures -- the Medicaid data are rough estimates of all types of hospital use. Furthermore, the HMO figures in column 5 do not include mental health days.

8. Medical-surgical (including ICU/CCU) and mental health days reported by the FLHSA, January 4, 1981. For 1973-75 these data refer to days by service; 1976-78 data refer to days by type of use.

9. The major difficulty with this summation is that the total Blue Cross use is not known.

10. Patient days in medical/surgical, ICU/CCU, rehabilitation, maternity, pediatrics, and mental health beds in the six-county Rochester area as reported by the FLHSA, Table 3-A, October 27, 1981.

The most substantial declines in Blue Cross use occur in the 1974-1977 period and are attributable both to declining enrollment and use per enrollee. Increases in Medicare and Medicaid use are partiucularly large in 1975-76, the years of the state Medicaid revisions. This supports the notion of hospital backup as an explanation. In order to be able to accept with confidence the roll of the "backup" as an explanation, several bits of evidence should fit together. First, there should be evidence of a relative reduction in the use of long term care facilities by Medicare and Medicaid patients. Second, these patients should be observed "backing up" in general, acute care hospitals. Third, hospital capacity should appear to be increasingly pressured.

Table 5 presents data concerning the availability and use of long term care facilities, termed, "skilled nursing facilities and health related facilities," in New York. The number of licensed beds increased between 1973 and 1974, with the exception of 1975, but remained relatively stable thereafter. Data for the latter part of the period even indicate a small reduction in staffed beds, and an additional 350 beds have been approved but not built, suggesting that current reimbursement rates do not make expansion of capacity profitable. The stable bed supply is contrasted with a growing elderly population, resulting in a declining ratio of beds to population aged 65 and over. While there has been a small increase in average daily census, there is a marked decline in discharges. This indicates that patients are staying longer, which is consistent with reports that homes are only admitting the less sick patients (FLHSA, 1981). More importantly, the reduced turnover means a lower probability that a bed will be available on any given day for a transfer from an acute hospital. The final column indicates a marked increase in the number of patients awaiting placement.

Table 5

Rochester Area
Skilled Nursing Facility and Health Related Facility Capacity and Utilization
1973 - 1979

	Beds			Patient Days					
	Licensed[1]	Staffed[2]	Staffed/ Licensed Ratio[3]	Total[4]	Average Daily Census[5]	ADC Licensed Beds[6]	Discharges[7]	Licensed Beds/ 1,000 Pop 65+[8]	Patient Awaiting Placement
1973	5,969	NA	NA	NA	NA	NA	NA	59.89	NA
1974	6,206	NA	NA	2,107,062	5,773	.930	7,776	61.78	119
1975	6,647	NA	NA	2,150,640	5,892	.886	7,213	65.66	NA
1976	6,192	NA	NA	2,210,780	6,040	.976	7,397	60.29	NA
1977	6,201	6,081	.981	2,161,072	5,921	.955	6,882	59.52	115
1978	6,224	6,095	.979	2,173,996	5,956	.957	6,356	58.91	139
1979	6,221	(6,078)	(.977)	NA	NA	NA	NA	58.01	165

NA = Not available

Table 5
Notes

1. FLHSA, Tables 1D and 1E. The substantial reduction in licensed capacity in 1976 largely reflects the decertification of 304 HRF beds at Monroe Community Hosptal.

2. State of New York, Residential Health Care Facilities Reports for 1977 -1979. The RHCF-2 reports for 1979 were not avialable, so estimates were based on 1978 figures.

3. Column 2 divided by column 1.

4. FLHSA Table 3T for 1974-1977 and RHCF reports for 1978.

5. Column 4 divided by 365 or 366 for 1976.

6. Column 5 divided by column 1.

7. FLHSA Table 3X for 1974-1977 and RHCF reports for 1978.

8. FLHSA Table 2D for population aged 65 and over. Column 1 for licensed beds in Monroe County hospitals.

9. Patients awaiting placement in long term care facilities. FLHSA Backup Report, 1981.

The substantial increases in total Medicare and Medicaid patient days and days per enrollee were demonstrated in Table 1 and 4. Data from the Rochester area PSRO allow a further analysis of patterns of use by Medicare beneficiaries. (As noted in Appendix 1, the PSRO includes the six Rochester area counties plus Steuben county, and the PSRO and hospital-based data for aged beneficiaries in 1977 are within 2 percent of each other. Moreover, the six Rochester area counties account for 84.5 percent of total patient days.) The PSRO data in Table 6 show substantial increases in days of care in 1974-75 and especially in 1975-76. While Medicare disabled days show large percentage increases, the greatest year-to-year change is 5,246, in contrast to 31,684 for the aged. However, in the 1976-78 period the annual changes in days for both the aged and disabled were small and of the same magnitude, less than 6,000 out of a regional total of over one million patient days.

Although the data on days of care are consistent with the backup hypothesis, the discharge information are more difficult to interpret. Medicare aged discharges increased by 1,238 between 1974 and 1975 and by 2,120 from 1975 to 1976. The increased number of discharges, when multiplied by the average length of stay approximately account for the increase in days of care. Thus, the increase in Medicare use appears to be the result of more Medicare patients, not longer stays for Medicare patients due to a sudden inability to place them in long term care facilities. While there is no direct evidence of lengthening hospital stay due to "backup," the data in Table 7 indicate that the Rochester area Medicare beneficiaries were not experiencing declining lengths of stay comparable to beneficiaries either nationally or in New York State as a whole. This pattern is consistent with decreasing stays for most

Table 6

Rochester Area PSRO Medicare Patients

	Aged			Disabled		
	Discharges	Days	LOS	Discharges	Days	LOS
1974	30,532	399,534	13.1	2,691	35,458	13.2
1975	31,770	414,802	13.1	3,310	40,074	12.1
1976	33,890	446,486	13.2	3,771	42,855	11.4
1977	34,149	452,303	13.3	4,164	48,101	11.6
1978	34,292	453,721	13.2	4,205	46,222	11.0
	Discharges	Days	Disch* LOS_{t-1}	Discharges	Days	Disch* LOS_{t-1}
1974-75	+1,238	15,268	16,218*	+619	4,616	8,171*
1975-76	+2,120	31,684	27,772	+461	2,781	5,578
1976-77	+259	5,817	3,419	+393	5,246	4,480
1977-78	+143	1,418	1,888	+41	-1,879	476

*These estimates are based on the change in discharges multiplied by the length of stay on the previous year.

Includes Livingston, Monroe, Ontario, Seneca, Steuben, Wayne, and Yates counties.

Source: U.S. Health Care Financing Administration, "Number of Discharges, Days of Care, and Mean Length of Stay for Short-Stay Hospital Discharges by PSRO and Year of Discharge, Table A-9" New York 33002, Dated Quarters ending 0977, 3782,3800I.

Table 7

Patterns of Short-Stay Hospital Use by Medicare Aged Beneficiaries
1974-1977

	Discharge Rate/1,000			Days of Care/1,000			Length of Stay		
	NY002	New York	U.S.	NY002	New York	U.S.	NY002	New York	U.S.
1974	278	276	326	3,636	4,411	3,777	13.1	16.0	11.6
1975	287	283	330	3,761	4,563	3,761	13.1	16.1	11.4
1976	305	295	341	3,998	4,693	3,817	12.1	14.9	11.2
1977	303	303	346	3,906	4,542	3,767	12.9	15.0	10.9
Annual Percentage Change									
1974-75	+3.24	+2.54	+1.23	+3.44	+3.45	-0.42	0	+0.63	-1.72
1975-76	+6.27	+4.24	+3.33	+6.30	+2.85	+1.49	0	-1.23	-1.75
1976-77	-0.66	+2.71	+1.47	-2.30	-3.22	-1.31	-1.53	-5.66	-2.68
1974-77	+8.99	+9.78	+6.13	+7.43	+2.97	-0.26	-1.53	-6.25	-6.03

Source: Ronald Deacon et al., 1979.
These data are hospital-based, adjusted for the number of beneficiaries using hospitals within the PSRO. PSRO NY002 includes Livingston, Monroe, Ontario, Seneca, Steuben, Wayne, and Yates counties.

patients that are offset by longer stays for backup patients. The hypothesis cannot be aequately tested without much more detailed data. The figures in Table 7 also show that the rising discharge rate for Medicare aged beneficiaires in the Rochester area was not unique: smaller, but nonetheless significant, increases are apparent both statewide and nationally, and in all three cases by far the greatest increase was between 1975 and 1976.

The third step in evaluating the backup hypothesis, that is, the increased pressure on hospitals, depends on changes in both capacity and utilization. Table 8 presents the figures on licensed bed capacities for Monroe County (which includes Rochester) and other counties in the area. Between 1973 and 1975, area hospitals increased licensed acute capacity by 228, or 7 percent, and medical-surgical capacity by 145, or 6 percent. Thereafter capacity remained approximately constant until 1980. (Occasionally a hospital with a low patient census will not set up and staff all of its beds, so an occupancy rate computed from average census and licensed beds will over estimate short run excess capacity. A hospital-by-hospital comparison of the FLHSA-licensed capacities and AHA Guide Issue reported set up and staffed beds indicates that for Rochester area hospitals during the 1973 to 1978 period the two figures are generally identical. Inconsistencies usually occur when capacities are changed because of different reporting periods.) Table 9 indicates that throughout the period, occupancy rates were quite high and continued to increase in spite of the added capacity in the middle of the decade. Especially high occupancy rates are evident for medical-surgical beds most likely to be used by Medicare/Medicaid patients (Burke, 1980). Observers also report that the shortage of beds led to the temporary placement of med/surgical patients in other units, such as pediatrics (Puskin, 1981).

Table 8

Rochester Metropolitan Area
Bed Capacity, 1973 - 1980

	1973	1974	1975	1976	1977	1978	1979	1980
Total Acute (Includes Med-Surg, Maternity, Peds, Mental Health)								
Finger Lakes (4 counties)	719[1]	809[4]	811[6]	811	807[12]	776[14]	769[16]	779[17]
Livingston	85[2]	85	85	85	85	85	85	85
Monroe	2,422[3]	2,439[5]	2,558[7]	2,552[9]	2,558[13]	2,563[15]	2,563	2,566[18]
Total	3,226	3,333	3,454	3,448	3,450	3,424	3,417	3,430
Med-Surg - ICU/CCU, Self, Rehab								
Finger Lakes	654[1]	646	648[6]	648	648	646	639	623
Livingston	75[2]	75	75	75	75	75	75	70
Monroe	1,827	1,859	1,978[7]	1,978	1,986	1,991	1,991	1,847
Total	2,556	2,580	2,701	2,701	2,709	2,712	2,705	2,540
Mental Health								
Finger Lakes	18	18	18	18	18	18	18	18
Livingston	-	-	-	-	-	-	-	-
Monroe	172	172	172	172	169	169	169	169
Total	190	190	190	190	187	187	187	187
Long Term								
Finger Lakes	352	352	352	392[10]	392	392	392	392
Livingston	-	-	-	-	-	-	-	-
Monroe	918	918	918[8]	614[11]	614	614	614	734
Total	1,270	1,270	1,270	1.006	1,006	1,006	1,006	1,126

Notes

Table 8

Source:

Genesee Region Health Planning Council: "Genesee Region Hospital Patient Statistics, Daily Census Data - Long Term Care Beds, Percent Occupancy Comparison, Jan-Dec 1974 and 1973 and Dec 1974 and Jan-Dec 1975 and 1974 and Dec 1975." Finger Lakes Health Systems Agency: "Finger Lakes Health Service Area, Hospital Patient Statistics - Daily Census Data - Acute Care Beds, Percent Occupancy Comparisons, Jan-Dec 1976 and 1975 and Dec 1976" through "Jan-Dec 1980 and 1979 and Dec 1980."

1. Newark-Wayne Hospital (Wayne Co.) increased capacity from 91 to 181 beds on September 1, 1973, but this includes 10 ICU beds not opened until November, 1974.

2. Dansville Hospital (Livingston Co.) increased from 58 to 85 beds effective May 1, 1973. Addition assumed to be med/surg.

3. In Monroe County, Genesee Hospital added 35 Mental Health beds, June 1, 1973. Lakeside-Brockport Hospital added 3 beds, June 1, 1973.

4. Seneca Falls Hospital (Seneca Co.) reduced med/surg from 46 to 38 and increased pediatrics from 6 to 14 on August 1, 1974; Soldiers and Sailors (Yates Co.) closed its maternity unit of 7 beds on April 1, 1974 and reduced total capacity from 69 to 62.

5. Genesee Hospital (Monroe Co.) increased total capacity from 362 to 387 on October 7, 1974; med/surg from 254 to 275, pediatrics, 29 to 33. Highland Hospital shifted 11 beds from maternity to med/surg on April 1, 1974, and Rochester General temporarily decertified 8 pediatric beds, June 3, 1974.

6. Newark-Wayne Hospital (Wayne Co.) increased med/surg and total by 2 beds, February 1, 1975.

7. Highland Hospital increased med/surg and total beds by 3, August 1, 1975. Park Avenue Hospital license should have read 113 beds instead of 119; closed September 7, 1974, reopened September 8, 1975 as Park Ridge Hospital. St. Joseph's increased med/surg and total beds by 9, November 1, 1975. St. Mary's reduced total beds by 35: 8 from maternity and 25 from pediatrics, as of January 30, 1975. Strong Memorial moved all but mental health to new hospital, February 25, 1975 and increased total beds by 76: 41 in med/surg, 5 in maternity, 30 in pediatrics.

8. Monroe Community Hospital, licensed for 524 HRF beds, but only operating 220; request to decertify 304 HRF beds approved, February 9, 1976.

9. Lakeside-Brockport Hospital (Monroe Co.) reduced total and maternity beds by 3, December 17, 1976. Rochester General reduced total and pediatric beds by 3, April 6, 1976.

10. F. F. Thompson Hospital (Ontario Co.) opened a 40-bed HRF on August 9, 1976.

11. Monroe Community Hospital reduced total long term and HRF beds by 304, March 13, 1976.

12. Myers Community Hospital (Wayne Co.) reduced total capacity from 60 to 56 and pediatrics from 4 to 0, November 9, 1977.

13. Genesee Hospital reduced total and mental health beds by 3 on March 21, 1977. Highland Hospital increased total capacity by 9 on August 1, 1977: 7 in med/surg; 1, ICU; 1, maternity. Rochester General Hospital: beginning July 25, 1977 28 ICU beds were in use even though the operating certificate was for only 16 ICU beds. Certificate increased to 28 on February 1, 1978, but 1977 occupancy based on 16 ICU beds.

14. Clifton Springs Hospital (Ontario Co.) reduced med/surg capacity by 2 and increased ICU beds from 4 to 6 on March 1, 1978. Newark-Wayne Hospital (Wayne Co.) reduced total and maternity capacity by 13. Seneca Falls Hospital (Seneca Co.) reduced total and med/surg capacity by 2. Taylor-Brown Hospital (Seneca Co.) closed its 14-bed maternity unit, August 15, 1978. Myers Community Hospital (Wayne Co.) reduced total and maternity capacity by 2 on August 15, 1978.

15. Rochester General Hospital increased total capacity by 5 on February 1, 1978, decreasing med/surg by 7 and increasing ICU by 12.

16. F. F. Thompson Hospital (Ontario Co.) increased total and med/surg capacity by 10 on January 15, 1979. The hospital has been operating with 121 beds instead of the 111 licensed (101 med/surg, 7 CCU, and 13 maternity), but licensed capacity has not yet been changed (December, 1979). Newark-Wayne Hospital reduced total and med/surg capacity by 17 on June 15, 1979.

17. Geneva General Hospital (Ontario Co.) has been operating 8 ICU beds since February 1, 1980, rather than 6 as licensed. F. F. Thompson Hospital (Ontario Co.) increased licensed total acute beds from 111 to 121 on July 21, 1980: 101 med/surg, 7 ICU, 13 maternity.

18. Rochester General Hospital increased total med/surg beds by 3 on February 1, 1980. St. Mary's Hospital (Monroe Co.) closed their 10-bed pediatric unit, January 1978, but has not decertified them.

19. Geneva General Hospital has a 67-bed nursing home and a 42-bed progressive care unit, total LTC beds unchanged.

20. Park Ridge Hospital nursing home has submitted occupancy data for its 120 beds beginning January 1, 1980.

Table 9

Rochester Metropolitan Area Occupancy Rates
1973 - 1980

	1973	1974	1975	1976	1977	1978	1979	1980
Total Acute								
Finger Lakes (Central)	73.3	75.8	74.1	75.8	76.0	78.4	82.6	82.2
Livingston	64.2	72.0						
Monroe	81.9	84.7	84.2	84.7	84.3	85.6	86.3	85.9
Total								
Med-Surg ICU/CCU, Self, Rehab								
Finger Lakes	-	78.0	76.8	79.4	79.5	82.1	89.3	87.3
Livingston	65.1	74.4						
Monroe	86.8	88.3	87.2	87.6	86.8	88.1	90.0	89.8
Total								
Mental Health								
Finger Lakes	132.7	139.9	136.0	98.7	100.6	101.9	99.0	98.4
Livingston	-	-						
Monroe	81.8	90.2	88.7	89.1	89.1	91.4	93.9	92.7
Total								
Long Term								
Finger Lakes	86.0	90.8	95.6	96.3	97.7	98.4	99.1	98.8
Livingston	-	-	-					
Monroe	81.5*	75.7*	69.9*	87.8	94.9	94.8	94.2	94.9
Total								
SNF								
Finger Lakes	84.6	89.8	95.1	98.0	98.1	98.7	99.1	99.0
Monroe	103.9	98.5	100.6	99.3	95.8	98.0	97.8	98.4
Total								

Notes

See Table 9 for sources and notes

Table 10

Summary of Findings with Respect to the Backup and Competition Hypotheses

	Backup Hypothesis	HMO Competitive Effect	Other
Increase in patients awaiting placement in LTC facilities	+	-	?
Decrease in LTC capacity	+	?	?
Decrease in LTC discharge rate	+	-/?	?
Increase in medical/surgical occupancy rate	+	-	?
Longer stays for Medicare beneficiaries	+	+/?	?
Small HMO market share	?	-	?
Failure of the IPA HMO	?	-	?

The relatively small changes in hospital capacity and occupancy rates during the 1970s mean that a one-for-one exchange of backup patients for Blue Cross patients will not be observable. However, the changes in occupancy do suggest increased pressure on hospital resources, and this is in an area notable for its generally conservative utilization rates. A long history of health planning in the Rochester region has resulted in a ratio of 3.7 acute beds per 1,000 population for the FLHSA in contrast to a New York State ratio of 4.5 and a U.S. level of 4.6 (FLHSA, 1979.

The data clearly show declining hospital use by Blue Cross members coupled with increasing Medicare and Medicaid use. The question is whether the causation is (1) from hospital backup to decreased Blue Cross use, (2) decreased Blue Cross use, perhaps because of competition from HMOs, which freed beds to be filled by Medicare and Medicaid beneficiaries, or (3) some third causal mechanism. The growing list of patients awaiting placement in long term care facilities and the falling LTC discharge rate are consistent with the first explanation and inconsistent with the second. Relatively increasing lengths of stay for Medicare beneficiaries clearly supports the backup hypothesis but are consistent with the competition hypothesis if one believes public patients follow Roemer's law but private patients do not.

The history of HMOs in the Rochester area is also not very supportive of the competition hypothesis. By the mid-1970s, when the Blue Cross utilization decline was at its peak, HMO enrollment was less than five percent of that in Blue Cross, the plan sponsored by the local medical society was failing, and the other HMOs were growing less rapidly than anticipated. If fee-for-service physicians could not exercise sufficient control over

hospital use while in their own Individual Practice Association HMO, why should more cost-effective behavior be expected without such an organization? While it is possible that Rochester Blue Cross exercised such controls, one would have expected at least some outcry from local physicians and some external reasons for the plan to take such actions. In fact, Rochester Blue Cross was doing so well in this period that it lowered premiums by five percent in 1978 and held them constant through 1980. These already low premiums have been a major marketing obstacle for the local HMOs, so it is doubtful that Rochester Blue Cross felt competitive pressures to lower them.

These findings are generally supportive of the backup hypothesis and tend to reject the competition hypothesis (See Table 4). Of course, other factors may also be at work. The declining Blue Cross enrollment is suggestive of other, as yet unspecified forces in the Rochester health insurance market. Various changes in New York's reimbursement rates may have had an effect on utilization, costs, and enrollment in various plans. While the premium reduction by Rochester Blue Cross is noteworthy, the claims expense per member in Rochester actually rose more rapidly during the 1973 - 1979 period than for the Blue Cross plans of Buffalo, Sysracuse, or Utica (Blue Cross-Blue Shield Fact Books, 1974 - 1980). This suggests that the Rochester experience might not be unique and that it probably was independent of the local HMO growth.

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Chapter 5

Minneapolis/St. Paul, Minnesota*

The Twin Cities of Minneapolis-St.Paul have been the greatest focus of attention for discussions of vigorous competition among several HMOs (Christianson and McClure, 1979; Faltermayer, 1978; Enthoven, 1980). One might argue that the apparent absence of major competitive effects in Hawaii and Rochester is due to the fact that those markets do not have multiple major HMO options, as do the Twin Cities. Moreover, six of the seven HMOs in Minneapolis-St.Paul have chosen state rather than federal qualifications; the former allows more flexibility in setting premiums and benefits and thus allows more vigorous competition. While federal tax laws and unequal employer contributions in the Twin Cities do not match the competitive models suggested by Enthoven and McClure, the Minneapolis-St.Paul area is probably the closest current approximation to a competitive medical care market.

Various reports from the Twin Cities substantiate the impression of a competitive process in terms of longer clinic hours, the opening of outreach centers, and increased awareness of health plan options (Christianson and McClure, 1979; Faltermayer, 1978). The evidence supporting the notion that this competition is cost containing is less solid.** Between 1976 and 1979, per capita medical care costs in Minnesota rose 39.6 percent, slightly more rapidly than the U.S. average of 38.9

*by Harold S. Luft.

**Note that competition is not new in medical care--for instance, hospitals compete for physicians by purchasing desirable new equipment and the result is increased costs. The new wrinkle is that competition among HMOs is supposed to be cost containing.

percent (Gibson, 1980; University of Minnesota Center for Health Services Research, 1981). Because such expenditure data are rather imprecise, our analysis will focus primarily on hospital utilization statistics.

Hospital Use Trends in Minneapolis-St.Paul

One might think that an examination of trends in hospital use would be a straightforward exercise, but several factors complicate this approach in the Twin Cities area. Unlike the situation in Hawaii or Rochester, the broad patterns of use in Minneapolis-St.Paul do not exhibit large increases or decreases, so attention must be focused on relatively small changes. Minneapolis-St.Paul has also been the subject of much analysis and discussion, some of it highly charged, so that there are several sets of hospital data, often exhibiting substantial differences. Some of the differences stem from definitions, methods, or geographic coverage, while others remain unexplained. Furthermore, reconciliation is made more difficult because the data are used to support various points of view. The next two subsections discuss alternative estimates of the two major components of hospital utilization data--population denominators and patient days or admissions.

How Many People Live in Minneapolis-St. Paul?

Direct population counts are only performed every decade during the U.S. Census and even those figures are subject to varying degrees of error. For the intervening years, estimates are developed by the Census

Bureau and local government officials based on birth and death records and, in some cases, local data such as drivers' licenses. Intercensal estimates at the county level are provided by the U.S. Census Bureau in its Current Population Reports Series P-25 and other groups may develop their own estimates. Table 1 presents some of the population figures used in various analyses of Twin Cities hospital use. In some cases the implicit population trends differ substantially, such as in column 5, in which the population peaks in 1979 and then declines. The difference between some of the series in certain years is up to 3 percent (e.g., 1978 for columns 4 and 5). The percentage discrepancy is larger than any of the year-to-year changes in hospital use and can have an important impact on the interpretation of utilization patterns.

Now that final Census counts are available for 1980, the question is whether straight-line interpolations should be used for intervening years (see the Metropolitan Health Board figures in column 6) or whether the earlier intercensal estimates should be used, as in column 1). The intercensal estimates through 1978 suggest an increase in population growth after 1975 and a projection of that growth would probably come fairly close to the 1980 count. (This is supported by a substantial increase in the birth rate after 1977.) While the ambiguous population figures will lead us to focus primarily on total hospital use, rather than rates, when we must use population denominators they will be the U.S. Census figures shown in Table 1, column 1.

Table 1

Minneapolis-St. Paul Area Population Estimates

	U.S. Census Estimates [1]	Minnesota Department of Health [2]	InterStudy [3]	Council of Community Hospitals [4]	Metropolitan Health Board [5]	Metropolitan Health Board [6]
1970	1,874,612				1,874,612	1,874,612
1971	1,894,200		1,894,200		1,894,895	1,885,721
1972	1,891,600	1,891,600	1,898,500		1,910,325	1,896,831
1973	1,899,200	1,899,200	1,899,200		1,931,225	1,907,940
1974	1,914,900	1,914,900	1,914,900		1,945,795	1,919,049
1975	1,912,500	1,912,500	1,912,500		1,955,585	1,930,158
1976	1,924,100	1,924,100	1,922,000		1,965,635	1,941,268
1977	1,931,500	1,931,500	1,929,688	1,929,688	1,976,440	1,952,377
1978	1,945,600	1,945,600	1,933,547	1,933,547	1,990,760	1,963,486
1979	1,965,653*	1,959,803	1,941,281	1,941,281	1,991,140	1,974,596
1980	1,985,705			1,972,222	1,985,705	1,985,705

Minneapolis-St. Paul metro area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties.

* Estimated

Notes

Table 1

1. U.S. Bureau of the Census, Current Population Reports, "Estimates of the Population of Counties and Metropolitan Areas", Series P-25, Numbers 505, 537, 618, 709, 739, 810, 873.

   Note: 1970 and 1980 data refer to April 1, other years to July 1.
   1978 data are labelled provisional.
   1979 figure is the average of the 1978 and 1980 figures.
   1980 figure is the final 1980 Census count, reported in
   "Standard Metropolitan Statistical Areas and Standard Consolidated Statistical Areas - 1980, "Census of Population" Supplementary Reports, PC80-S1-5, October 1981.

2. Minnesota Department of Health, Statistical Report on Health Maintenance Organization Operations in Minnesota, 1979. Table 3 in the Report notes the estimate for 1979 is based on 1978 figures. In fact, the growth in population between 1979 and 1978 is .73 percent, exactly the same as the growth between 1978 and 1977.

3 Linda Krane Ellwein, Health Care Trends: Minneapolis-St. Paul Summary Highlights, Excelsior, MN: InterStudy, August 1979. Page 5 notes that the population figures for 1977-1979 are based on a growth rate equal to the average rate of population growth for the previous six years. Note, Ellwein's revised manuscript uses the figures shown in column 1, with the exception of 1972 and 1976 where her estimates are labelled provisional.

4. Allan N. Johnson and Rolf A. Madson, Twin City Hospitals: Selected Facts, Figures, Questions and Answers. Minneapolis: Council of Community Hospitals, December 1981. Page 79 references a 1981 version of Ellwein's report for 1977-79 data. 1980 figures have a reference to 1980 Census: Preliminary Reports.

5. Metropolitan Health Board, Phase IV Report on General Acute Inpatient and Specialty Services, July 1981. The 1970 and 1980 are actual Census counts as of April 1. The intervening figures are identified as estimates.

6. Metropolitan Health Board, tables reproduced in Ellwein, 1981. These population figures are a straightline interpolation between the 1970 and 1980 Census counts.

Alternative Measures of Hospital Use

The discussion of population estimates underscored the fact that with the exception of an occasional special local census, no one attempts accurate estimates of intercensal populations. Hospital use figures, however, are supposed to be collected yearly. Moreover, some of the problems which cause census undercounts should not be a problem when determining the number of patients in a hospital during a year. In spite of these apparent advantages, there are several quite different series for hospital use in the Minneapolis-St. Paul area. Some of the differences arise from changing geographic boundaries or the inclusion of different hospitals and patients. Others may stem from adjustments made for non-reporting hospitals. Still other differences arise from different approaches to counting patients. Although on a year-to-year basis the discrepancies may be in the order of one to three percent, the choice of series can make the difference between a net increase or decrease in hospital use.

Table 2 presents various estimates of patient days in the Twin Cities area. The first three columns illustrate several problems within data from a single source, the American Hospital Association. Column 1 is taken from the annual editions of Hospital Statistics, which reports inpatient days for standard metropolitan statistical areas or SMSAs. While the AHA uses the then current definition of the SMSA in aggregating its data, through 1978 the publication included a map showing the 1970 SMSA definitions. In 1973 the Minneapolis-St. Paul SMSA was expanded from five to nine counties in Minnesota (plus one county in Wisconsin) and this resulted in a sharp

Table 2

Minneapolis-St. Paul Area

Patient Days

	AHA Community Hospitals							
	Hospital Statistics	Hospital Guide Issue		Total Acute		General		
	SMSA [1]	SMSA [2]	Seven County Metro Area [3]	Metro-politan Health Board [4]	Council of Community Hospitals [5]	Metro-politan Health Board [6]	Council of Community Hospitals [7]
1970				2,687,631		2,460,760	
1971	2,753,560	2,753,560 (2,702,178)*	2,824,005 (2,770,254)*	2,642,868		2,420,162	
1972	2,694,493	2,694,795	2,762,685	2,588,722		2,357,806	
1973	2,782,647	2,802,470	2,755,020	2,574,363		2,337,663	
1974	2,839,498	2,859,410	2,808,675	2,636,818		2,389,243	
1975	2,814,079	2,833,860 (2,861,754)*	2,784,220 (2,812,344)*	2,662,392		2,271,441	
1976	2,847,144	2,853,935	2,804,660	2,702,992		2,305,388	
1977	2,806,801	2,822,545	2,774,365	2,648,946	2,712,908	2,210,529	2,283,938
1978	2,807,482	2,796,265	2,720,710	2,597,953	2,727,552	2,140,384	2,248,519
1979	2,780,760	2,768,890 (2,801,730)*	2,692,240 (2,723,406)*	2,603,018	2,724,178	2,125,413	2,225,487
1980	2,878,473	2,794,075	2,715,965	2,633,487	2,794,810	2,156,478	2,273,498

* Indicates patient days based on average daily census multiplied by 366.

Notes

Table 2

1. Patient days reported for community hospitals in Minneapolis-St. Paul, Minnesota SMSA in AHA Hospital Statistics.

2. Patient days estimated from average daily census in all short-term hospitals in the Minnesota portion of the SMSA. For 1971-1972 this includes Anoka, Dakota, Hennepin, Ramsey, and Washington counties. From 1973 on, Carver, Scott, Wright, and Chisago counties are included. For 1976-1979 Princeton Community Hospital, located in Mille Lacs county,is included as part of Fairview Hospital in Hennepin county, it has therefore been included as part of Hennepin county for all years. Queen of Peace Hospital is listed as being in LeSeur and Scott counties and is included as part of Scott county. Shriner's Hospital is classified as long term for 1971-1978 and is excluded for all years. Samaritan Hospital did not report data to the AHA for 1979 and 1980 so Metropolitan Health Board data were used. The following hospitals were missing data for specific years so figures were interpolated from AHA data: Health Central - 1977, 1979; Regina Memorial - 1977; Buffalo Memorial - 1977 and 1979. Both the seven county figures and the SMSA figures for 1973 on include Queen of Peace Hospital in New Prague. This hospital is listed as being in LeSeur and Scott counties and is included in both the Metropolitan Health Board and Council of Community Hospitals data. It is probably not included in the Hospital Statistics data in all years.

3. Hospitals in the seven county metropolitan area only are included: Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington. See note 2.

4. Total acute days in community hospitals in the seven county metro area as reported by the Metropolitan Health Board. These figures do not include the Veterans Administration Hospital, Anoka State Hospital or Hastings State Hospital. Gillette Children's Hospital, formerly Gillette State is sometimes included for some or all of its services, with total patient days in any year being under 10,000. 1972, 1976 and 1980 data are adjusted for leap year, that is, they represent 365 days.

5. Total acute days as reported by the Council of Community Hospitals, Johnson and Madson, 1981. See Table 3 for a reconciliation with Metropolitan Health Board statistics.

6. General hospital days includes patient days categorized as medical/surgical, pediatrics, and obstetrics. It does not include psychiatry and, after 1974 chemical dependency. However, from 1970 to 1975 patients with chemical dependency problems may have been considered medical, pediatric or psychiatric patients.

7. General hospital days includes medical/surgical, pediatrics obstetrics, and newborn.

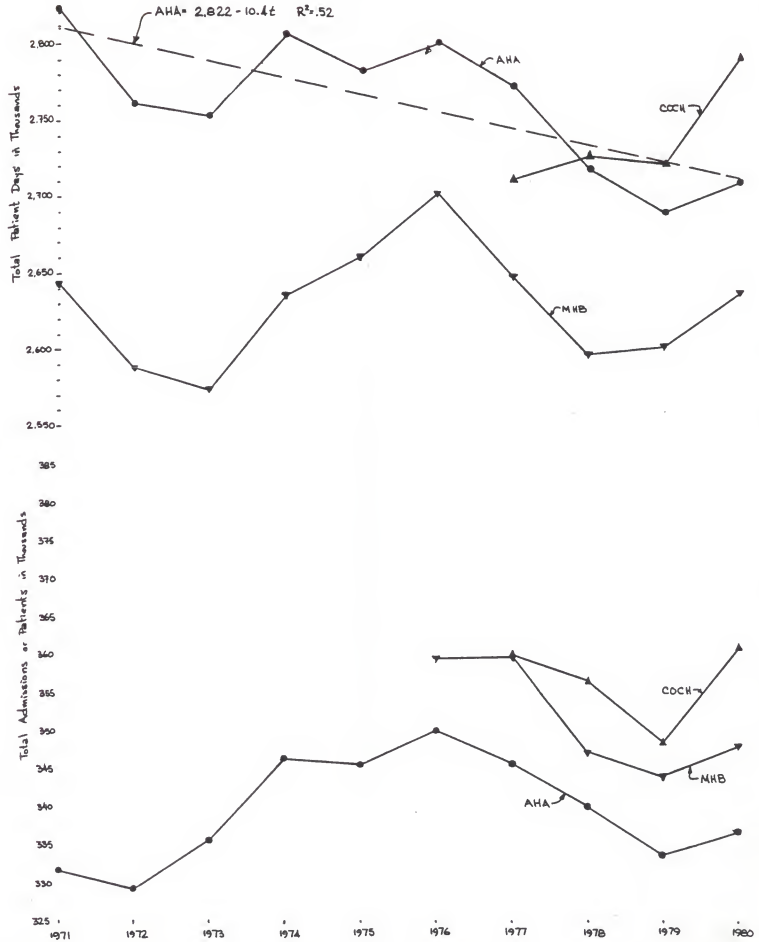
increase in the number of patient days. To adjust for the changing size of the metropolitan area, data were drawn from the AHA Guide, which lists each AHA registered hospital and selected data such as admissions and average daily census. A series was developed for each hospital in the nine-county area for the ten-year period. This approach allowed the interpolation of data when a hospital did not report in a specific year. It also identified some anomolies, such as one hospital's being listed in two counties and another hospital's being included in the statistics of the a hospital of which it was a division. Aggregating daily census figures incorporates rounding errors which are magnified by a factor of 365. Similarly, leap years force one to ask whether utilization rates should be defined in terms of calendar years or arbitrary periods, such as 365 days. While the figures in columns 1 and 2 are reasonably close, there are some notable discrepancies, including a particularly high estimate in Hospital Statistics for 1980. (Even with leap year adjustments, this difference is 2.7 percent, comparable to the largest differences seen over a decade.) Column 3 of the table presents the AHA data for a consistently defined seven county metropolitan area.

There are two major local sources of hospital data, the Metropolitan Health Board, (MHB) which is the official Health Systems Agency for the area and the Council of Community Hospitals, (COCH) representing 30 of the area's 33 community hospitals. The MHB data have the advantage of providing an 11-year series. These figures are consistently below those of the AHA for the same hospitals. Part of this difference, which decreases from about 182,000 to 82,000 over the decade, is undoubtedly due to the

inclusion of long term patient statistics in the AHA data. However, individual hospitals seem to report these data in varying ways, because extended care and rehabilitation days amounted to 182,250 in 1980 according to MHB, in contrast to a difference on "only" 82,478. Moveover, a comparison of census reports in the Guide and MHB statistics indicates close aggreement for many hospitals but discrepancies for others that are not explained by extended care or rehabilitation patients.

Figure 1 presents the trends in patient days and admissions for the seven-county area from the three sources. The AHA and MHB data exhibit similar patterns for 1976-1980, with some narrowing of the difference in the last two years. A substantial narrowing occurs in the first part of the decade and this raises several alternative interpretations of the overall pattern. One interpretation is that there is a slow general decline in hospital use, as indicated by a line fitted through the AHA data points that shows an annual decrease of about 10,400 days per year. A second interpretation is that hospital use was increasing from 1972 through 1976 and then began a marked decline. The mid-decade peak is most noticeable in the MHB data, and this pattern would support the notion of a cost or utilization reducing competitive effect in the latter 1970's. The admissions data from the AHA in the lower part of Figure 1 support this peaking pattern. All three sets of data indicate an upswing in patient days and admissions for 1980. This may reflect some of the underlying dynamics of the medical care system or an aberration, such as severe influenza and pneumonia outbreaks in January, February and December 1980 (U. S. Centers for Disease Control 1981).

Minneapolis-St Paul Area Trends in Hospital Use, 1971-1980.



Notes

Figure 1

AHA = American Hospital Association seven county area data.

MHB = Metropolitan Health Board, total acute patient days and admissions.

COCH = Council of Community Hospitals, total acute patient days and discharges.

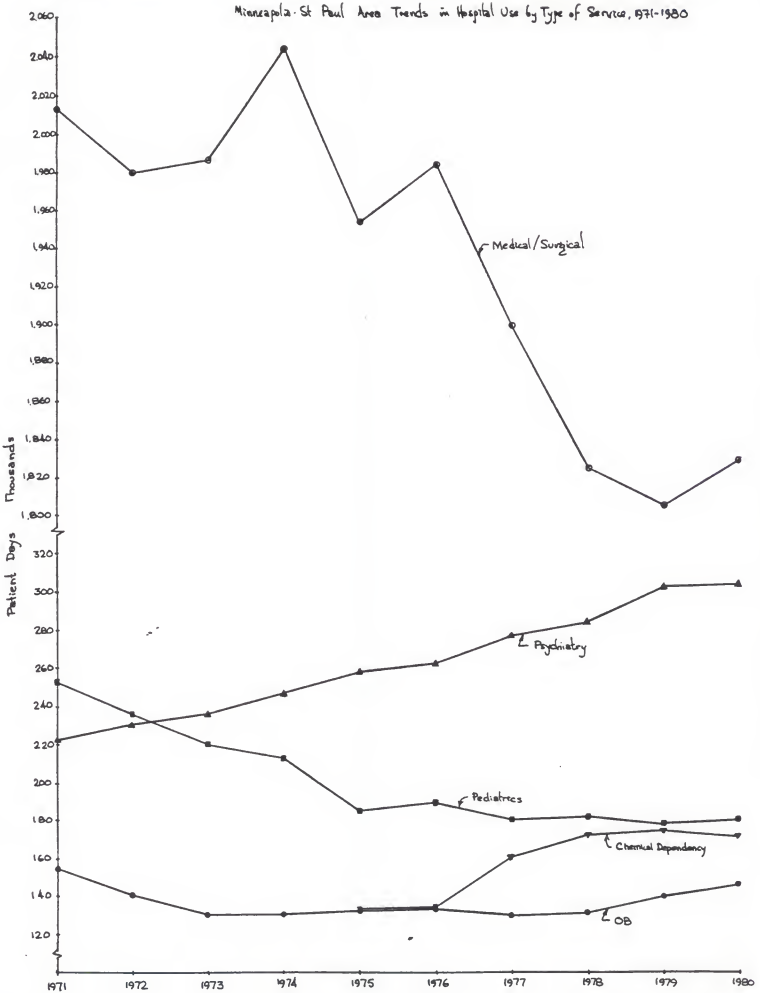
See also notes to Tables 2, 3, and 4.

The Effects of Alcoholism/Chemical Dependency Coverage

One important factor that confounds the analysis of HMO competitive effects in Minneapolis-St. Paul is the state mandated coverage of alcoholism and chemical dependency treatment. Effective October 1, 1973, new or renewal group insurance policies had to cover a minimum of 28 days of alcoholism or drug abuse treatment in hospitals and licensed residential treatment facilities. Effective October 1, 1976 policies also had to cover treatment in extended rehabilitation facilities and halfway houses as well as 130 hours per year of outpatient treatment (Blue Cross and Blue Shield of Minnesota, 1980). The effect of these changes was to increase substantially inpatient use for alcoholism and chemical dependency treatment during the same period that HMO growth was taking place. Fortunately, the data from the Metropolitan Health Board and the Council of Community Hospitals allow the separation of total acute care use into various categories, including psychiatry, alcoholism/chemical dependency, medical-surgical, pediatrics, and obstetrical categories.

Figure 2 presents the trends in patient days per year for each of these categories with the exception of alcoholism/chemical dependency (ACD), which has been classified separately only since 1975. Since 1975, ACD patient days rose from about 130,000 to 170,000, with most of the increase occurring between 1976 and 1978. Clearly, some patients with alcoholism and chemical dependency problems were treated prior to the separate data collection, and the sharp decline of 110,000 medical/surgical patient days between 1974 and 1975 may represent that reclassification. Similarly, the 60,000 increase in medical/surgical days from 1973 to 1974

Minneapolis-St Paul Area Trends in Hospital Use by Type of Service, 1971-1980



Notes

Figure 2

Source: Metropolitan Health Board, Health Board Report of Hospital Utilization Rates.

See also notes to Tables 2, 3, and 4.

may reflect actual increases in hospital use attributable to the expansion in coverage.* Even with the reclassification, some ACD patients may be included in the medical/surgical category in these data because classification is by hospital unit, rather than patient diagnosis. Thus, hospitals with ACD patients but no ACD units may report them under the medical/surgical category. The use of psychiatric days shows a long steady increase over the period, unaffected by the ACD law or data reclassification.

It is probably impossible to determine precisely what accounts for the changing patterns of hospital use during the 1970's in the Twin Cities. However, it seems plausible to argue that the sharp increase in medical/surgical use in 1974 and its subsequent fall in 1975 as ACD patients were separately classified is a result of the 1973 law. If true, then the overall medical/surgical pattern seems to indicate a slow decline in use from 1970 to 1976, followed by a much more rapid decrease. The change in trends may reflect population shifts and this interpretation will be sensitive to the population series chosen. Of course, a steeper decline in the second half of the decade is also consistent with a cost-containing impact of HMO competition. Fortunately, more detailed data are available for the last few years which may help in understanding recent changes in hospital use.

*It is unlikely that patients were not treated prior to the expanded coverage. Instead, stays were probably much shorter. Nationally, average stays for alcoholism/chemical dependency are about 9 days in contrast to about 20 days in the Twin Cities (US NCHS Series 13/35 1978, and Metropolitan Health Board utilization data).

Reconciling Metropolitan Health Board and Council of Community Hospital Data

The two most detailed sets of hospital use data are provided by the Metropolitan Health Board (MHB) for 1976-1980 and the Council of Community Hospitals (COCH) for 1977-1980. However, columns 4-7 of Table 2 indicate substantial differences in these two data sets. Because each source has certain advantages--the MHB data are available by hospital and the COCH data include information about patients' residence, age, diagnosis, and expected source of payment--both will be used in subsequent discussion. Therefore, a reconciliation of the differences is in order.

Both data sets refer to community hospitals in the seven county metropolitan area. (The MHB includes data from Anoka State, Hastings State, and the Veterans Administration hospitals, but these are excluded from the following discussion.) The COCH data, however, do not include Samaritan, Memorial, or Watertown Hospitals, the last of which closed in 1979. The second major difference is that the MHB excludes nursery days in its totals (these are reported separately) while the COCH includes these days. (The MHB practice is comparable to that of the American Hospital Association, which excludes newborns.)

Tables 3A - 3D adjust the MHB data to the COCH methods by excluding the three hospitals and including newborns. These adjustments reduce the discrepancies to less than two percent of total patient days. The remaining differences are attributable to several factors. The first is a difference in the underlying methods used by the two groups. The MHB, following standard

Table 3A

METROPOLITAN HEALTH BOARD - COUNCIL OF COMMUNITY HOSPITALS RECONCILIATION

ACUTE PATIENT DAYS (INCLUDING PSYCHIATRY, CHEMICAL DEPENDENCY)

	Hospitals Included in MHB Data			Hospitals Not Included in COCH Data					COCH Methods & Hospitals		
				Acute			Nursery				
	Acute Total	Nursery	Total	Samaritan	Water-town	District Memorial	Water-town	District Memorial	Net MHB Patient Days	COCH	COCH-MHB
1977	2,648,946	121,797	2,770,743	16,022	5,573	10,817	427	873	2,737,031	2,712,908	-24,123
1978	2,597,953	123,007	2,720,960	16,687	4,607	10,033	273	779	2,688,581	2,727,552	38,971
1979	2,603,018	132,590	2,735,608	14,596	1,418	11,356	78	749	2,707,411	2,724,178	16,767
1980*	2,640,702	139,318	2,780,020	15,600	-	10,638	-	841	2,752,941	2,794,810	41,869
Year to Year Changes											
1977-1978			-49,783						-48,450	+14,644	
1978-1979			+14,648						+18,830	- 3,374	
1979-1980			+44,412						+45,530	+70,632	

Column 3 + Column 1 - Column 2; Column 9 = Column 3 - Sum(Columns 4-7).

Both data sets refer to the seven county metro area. COCH does not include data from Samaritan, Watertown, and District Memorial Hospitals. COCH includes nursery days which are excluded from the MHB Acute day counts. Watertown Hospital closed in 1979. Samaritan has no nursery.

* 1980 Metropolitan Health Board data are not adjusted for leap year.

Sources: Metropolitan Health Board: Health Board Report of Hospital Utilization Rates for 1976-1980
Council of Community Hospitals: Allan N. Johnson and Rolf A. Madson, Twin City Hospitals: Selected Facts, Figures, Questions and Answers, 1981.

Table 3B

GENERAL HOSPITAL DAYS (EXCLUDES PSYCHIATRY AND CHEMICAL DEPENDENCY)

	Hospitals Included in MHB Data			Hospitals Not Included in COCH Data					COCH Methods and Hospitals		
							Nursery				
	General Total	Nursery	Total	Samaritan	Water-town	District Memorial	Water-town	District Mem-orial	Net MHB Patient Days	COCH	COCH-MHB
1977	2,202,211	121,794	2,324,005	16,022	5,573	10,817	427	873	2,290,293	2,283,938	- 6,355
1978	2,131,150	123,007	2,254,157	16,687	4,607	10,033	273	779	2,221,778	2,248,519	26,741
1979	2,117,218	132,590	2,249,808	14,596	1,418	11,356	78	749	2,221,611	2,225,487	3,876
1980	2,162,386	139,318	2,301,704	15,600	-	10,638	-	841	2,274,625	2,273,498	-1,127
				Year-to-Year Changes							
1977-1978			-69,848						-68,515	-35,419	
1978-1979			-4,349						- 167	-23,032	
1979-1980			+51,896						+53,014	+48,011	

Table 3C

ACUTE ADMISSIONS

	Hospitals Included in MHB Data			Hospitals Not Included in COCH Data					COCH Methods and Hospitals		
							Nursery				
	Acute Total	Nursery	Total	Samaritan	Water-town	District Memorial	Water-town	Mem-orial	Net MHB Admissions	COCH Admissions	COCH-MHB
1977	359,878	29,300	389,178	2,417	761	2,317	98	220	383,365	360,189	-23,176
1978	347,424	30,092	377,516	2,655	643	2,079	61	204	371,874	356,673	-15,201
1979	344,141	32,156	376,297	2,527	196	2,139	21	188	371,226	348,679	-22,547
1980	348,209	33,928	382,137	2,850	-	1,955	-	212	377,120	361,421	-15,699

Table 3D

GENERAL ADMISSIONS

	MHB Hospitals General Total	Adjustments: Plus Nursery, Minus Admissions in Samaritan, Watertown & Memorial*	COCH Methods and Hospitals		
			Net MHB Admissions	COCH Admissions	COCH-MHB
1977	338,260	+23,487	361,747	337,055	-24,692
1978	325,792	+24,450	350,242	331,378	-18,864
1979	321,769	+27,085	348,854	322,390	-26,464
1980	325,101	28,911	354,012	333,790	-20,222

*All acute admissions to Samaritan, Watertown, and District Memorial are classified as general, so the adjustments are the same as shown in Table 3C.

American Hospital Association methods, uses the midnight census approach, whereby all patients at midnight are counted. The COCH computes the difference between discharge and admission date to get patient days except for patients admitted and discharged on the same day, in which case one patient day is counted. Such patients are not included in the MHB approach. Similarly, patients who leave the hospital on an overnight pass without being discharged will be counted by the COCH but not the MHB.

The second major difference is that the MHB data refer to patients in the hospital between January 1 and December 31, inclusive, while the COCH data refer to patients discharged within that period. Thus, the COCH patient day figures include use during the preceding year of patients discharged the following year and similarly exclude use of patients still in the hospital on New Year's eve. As long as discharges and length of stay remain relatively constant from year to year, these different methods will give comparable results. The rapid growth in psychiatric and ACD patients, with their long stays, however, suggests that the MHB approach will show more patient days in a year than the COCH approach. The figures in Tables 3A - 3D bear out this expectation. With the exception of 1978, the differences between the two data sets for general patients are very small, while substantial differences appear for all acute patients. Thus, psychiatric and ACD patients, who represent about 17 percent of the patient days, account for 71 percent of the differences between the data sources.

In addition to these methodological differences, there is a major remaining discrepancy between the two data sets for 1977, when the COCH counts

are below those of the MHB and show an increase from 1977 to 1978 in contrast to a sharp decline as indicated by both the MHB and AHA figures. This raises the question whether the MHB data are abnormally high for 1977 or the COCH data are abnormally low. In general, the COCH data may be more accurate, because they are based on uniform patient abstract data analyzed by a single agency, rather than the collection of summary statistics from each hospital. Arguing for the MHB figures, however, is the consistency in patterns for both the AHA and MHB series, and the fact that if the 1977 MHB figure were to be an overestimate, then the true change from 1976 to 1977 would be even more dramatic. It is also possible that in the start-up process at COCH some data may have been lost.

Thus far, most of the discussion has focused on total patient days, rather than admissions, even though the patient days are disproportionately influenced by the ACD patients with their long lengths of stay. The reason for this focus is that the MHB data on admissions include for some hospitals, transfers between units such as ICU to Med/Surg. and, at times, transfers within units, such as from Medicine to Surgery (See Table 4). This inflates the admissions counts by fifty percent in some hospitals. The MHB has been trying to have hospitals eliminate duplication, but the success of this strategy creates a downward bias over time in the overall admission data.

HMO and Non-HMO Hospital Use

HMO enrollment in Minneapolis-St.Paul grew relatively slowly in the first part of the 1970's and then accelerated in the second half of the

Table 4

MINNEAPOLIS-ST. PAUL : ADMISSIONS

	AHA Guide Issue[1]	Metropolitan Health Board[2]		Council of Community Hospitals[3]		Adjusted Metropolian Health Board[4]	
		Acute	General	Acute	General	Acute	General
1971	331,594						
1972	329,127						
1973	335,669						
1974	346,470						
1975	345,689						
1976	350,150	359,605	338,806				
1977	345,853	359,878	338,260	360,189	337,055	383,365	361,747
1978	340,160	347,424	325,792	356,673	331,378	371,874	350,242
1979	333,805	344,141	321,769	348,679	322,390	371,226	348,854
1980	336,961	348,209	325,101	361,421	333,790	377,120	354,012
		Annual Changes					
1971-72	-2,467						
1972-73	+6,542						
1973-74	+10,801						
1974-75	-781						
1975-76	+4,461						
1976-77	-4,297	+273	-546				
1977-78	-5,693	-12,454	-12,468	-3,516	-5,677	-11,491	-11,505
1978-79	-6,355	-3,283	-4,023	-7,994	-8,988	-648	-1,388
1979-80	+3,156	+4,068	+3,332	+12,742	+11,400	+5,894	+5,158

Notes

Table 4

1. Admissions data are derived from hospital specific entries in the annual Guide to the Health Care Field. In some cases data are interpolated and Metropolitan Health Board data are used for the last year of operation for Watertown and Riverview Hospitals. See notes to Table 2.

2. Metropolitan Health Board, Health Board Report of Hospital Utilization for all hospitals except Anoka State, Hastings State, Gillette, and Veteran's Administration.

3. Council of Community Hospitals, Twin City Hospitals..., Excludes Samaritan, Watertown and Memorial Hospitals. These data actually refer to patients discharged during the year. Newborns are included.

4. Metropolitan Health Board data are adjusted by adding nursery (newborn) admissions and excluding admissions to Samaritan, Watertown, and Memorial Hospitals.

decade. Enrollment went from 54,945 in three HMO's at the end of 1972 to 82,748 in six HMOs two years later. By 1975 all seven HMOs had been established, two had enrollments over 10,000, and more rapid growth had begun. Table 5 presents average annual HMO enrollment for 1975-1980, the years of rapid HMO growth and declines in area hospital use.

Average hospital use for HMO members has been quite low--514 to 440 days per 1,000--especially in contrast to utilization rates for the total Twin Cities area of 1456 to 1368 per 1,000. (In both cases the trend is generally downward.) The question is whether or not the falling utilization rate for HMO members has really been shared by non-HMO members. Table 5 presents the hospital admission and patient day rates for HMO enrollees, the whole Twin Cities population, and non-HMO enrollees.* As can be seen in Figure 3, total patient days per 1,000 in the Twin Cities area was falling during the late 1970's, yet patient days for non-HMO members (excluding HMO hospital days from the numerator and enrollees from the denominator) was essentially flat until a sharp increase in 1980. This pattern is somewhat less apparent for admissions, yet even in this case the exclusion of HMO members renders the data consistent with a flat pattern.

The preceding discussion used average hospital use in the nation as a benchmark, yet the true benchmark should be what hospital use in Minneapolis-St. Paul would have been without HMOs. Clearly, the latter figure is unknown,

*These data are not adjusted to account for residence. The population estimates refer to residents of the seven-county metro area, while the hospital use figures include out-of-area residents. Metropolitan Health Board data from Patient Origin studies indicates about 17 percent of all patient days are for out-of-area residents, a figure that has been roughly constant through the decade.

Table 5

Minneapolis-St. Paul

HMO and Non-HMO Hospital Utilization, 1975-1980

	Minneapolis-St.Paul Area HMOs					Minneapolis-St.Paul Area Total		
	Average 1/ Enrollment	Hospital Days/ 1/ 1000	Dis-charges/ 1/ 1000	Total Hospital Days (1)X(2)	Total Dis-charges (1)X(3)	Total 2/ Population	AHA Hospital 3/ Days	AHA Hospital 3/ Admissions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1975	93,579	514	89	48,100	8,329	1,912,500	2,784,220	345,689
1976	122,670	488	91	59,863	11,163	1,924,100	2,804,660	350,150
1977	163,734	509	89	83,340	14,572	1,931,500	2,774,365	345,853
1978	213,696	456	85	97,445	18,644	1,945,600	2,720,710	340,160
979	275,621	447	89	123,206	24,530	1,965,653	2,962,240	330,805
1980	364,169	440	88	160,234	32,047	1,985,705	2,715,965	336,961

	Non-HMO Enrollees					Minneapolis-St.Paul Area Total	
	Population (6) - (1)	Hospital Days (7) - (2)	Hospital Admissions (8) - (3)	Days/1000 (10)/(9)	Admissions/ 1000 (11)/(9)	Days/ 1000 (7)/(6)	Admissions/ 1000 (8)/(6)
	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1975	1,818,921	2,736,120	337,360	1,504	185	1,456	181
1976	1,801,430	2,744,797	338,987	1,524	188	1,458	182
1977	1,767,766	2,691,025	331,281	1,522	187	1,436	179
1978	1,731,904	2,623,265	321,996	1,515	186	1,398	175
1979	1,690,032	2,569,034	306,275	1,520	181	1,370	168
80	1,621,536	2,555,731	304,914	1,576	188	1,368	170

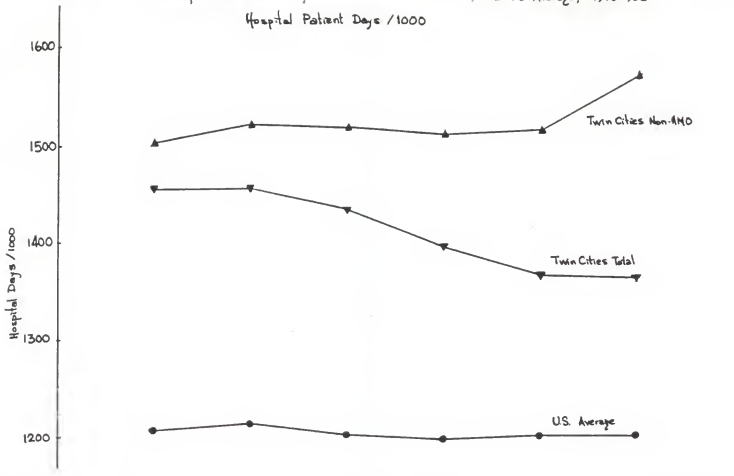
Notes

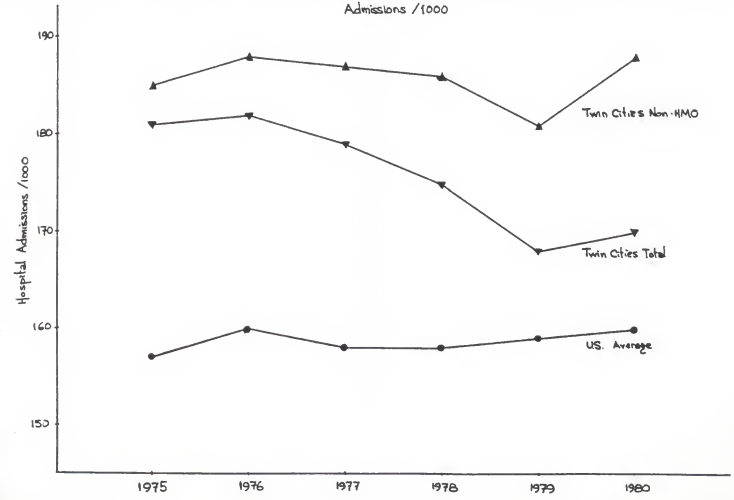
Table 5

1. Minnesota Department of Health, Statistical Report on Health Maintenance Organization Operations in Minnesota, 1980. Average enrollment is computed from the December 31 enrollments for the year shown and previous year.
2. U.S. Bureau of the Census, See Table 1.
3. American Hospital Association, See Table 2.

Minneapolis-St. Paul Area refers to Anoka, Carver, Hennepin, Ramsey, Scott, and Washington counties.

Minneapolis-St Paul ... US Average, 1975-1980





Notes

Figure 3

Source: Table 5 for Twin Cities figures. U. S. data from American Hospital Association, 1981, and U. S. Bureau of the Census, 1980.

but the U.S. figures should be corrected, as least implicitly, for one important discrepancy. Between 1970 and 1980, Minnesota had a substantially smaller increase in its population aged 45-64 and 65 and over than the U.S. as a whole, while its population in the middle years, aged 18-44 grew substantially more rapidly (U.S. Bureau of the Census, 1980, 1981). Thus, the shift in age distribution in Minnesota was towards those people utilizing less hospital care, and, therefore, one would expect a declining trend relative to the U.S. averages. Detailed population statistics for the Minneapolis-St. Paul area are not yet available, but local observers support the view that the age shift has been pronounced in the Twin Cities.

These data suggest that hospital use by non-HMO members has not followed the downward pattern exhibited by HMO members. However, the real question is whether or not use by non-members is higher or lower than what it would have been. The answer to this depends on (1) the effect of HMO competition on changes in the use pattern for non-HMO patients, and (2) the extent to which the HMO enrollees are representative of the overall population or are previously low users of hospital services. For instance, if one interprets the Twin Cities admission rate pattern for non-HMO enrollees as declining slightly through the late 1970's, in contrast to a slight increase for the U.S. average, then this difference in trend might be attributed to the competitive influence of HMOs on conventionally insured people. (The reverse patterns are present for total patient days, so this discussion is meant to be illustrative, rather than conclusive.)

However, one cannot interpret the non-HMO data without making some assumptions about the selection of enrollees into HMOs. The preceding discussion assumed implicitly that people joining HMOs have utilization rates equal to the average in the area. This means that had there been no HMOs, and if the HMO competitive effect is negligible, the total Twin Cities utilization rate would be the same as the measured rate for non-HMO enrollees. Alternatively, one might assume that HMOs produce no direct change in utilization patterns and that they merely attract patients and physicians who are low utilizers of hospital care. (While extreme, this hypothesis has some support from studies of fee-for-service group practices, including St. Louis Park in Minneapolis, which demonstrate hospitalization rates comparable to HMOs (Scitovsky, 1981; Christianson and McClure, 1979). If HMOs serve merely to attract low utilizers, then the Twin Cities total rate is unaffected by HMO growth, and the divergence between the total and non-HMO rates merely reflects a concentration of high users in conventional systems. Without additional data it is impossible to determine the importance of selection and competitive effects in Minneapolis-St.Paul. Instead, various bits of circumstantial evidence will be used to set some rough bounds on the relative importance of the two effects.

Trends in Use by HMO Members

The assumption that people joining HMOs are representative of the Twin Cities population is untenable given the relatively low proportions of the poor and elderly in HMOs. In fact, much of the low hospital use by some

Twin Cities HMOs has been attributed to their low proportion of elderly enrollees (Kleinman, 1981). Using 1978 to 1980 data, Ellwein (1982) shows that year-to-year changes in plan-specific use are not closely related to changes in age composition. On the other hand, these same data are consistent with the view that the major differences among plans are associated with enrollment patterns, while differences over time are associated with other factors.

The seven HMOs in the Twin Cities area experienced a 15 percent decline in hospital days per 1,000 enrollees from 515 in 1977 to 440 in 1980 (Minnesota Department of Health, 1979, 1980). During the same period, their hospital days for mental health/chemical dependency fell from 115/1000 to 65/1000. Apparently, a concerted effort to reduce utilization in this area accounts for 67 percent of the total reduction in hospital use (50/75) despite the fact that such use accounted for only 22 percent of the total in 1977. Discharges for mental health/chemical dependency fell from 6 to 4 per 1000 while total discharges fell from 90 to 88 per 1000, again suggesting a disproportionate share of the change occurred among MH/CD cases.

If the reduction in MH/CD use were entirely through shorter stays, then one could more readily believe a change in treatment pattern was involved. In fact, average stay for MH/CD cases in HMOs fell from 19.7 to 18.0 days between 1977 and 1979 (1980 data are not available). Larger proportionate declines occurred for other types of cases in HMOs, although for the Twin Cities area as a whole, Metropolitan Health Board data show a

small increase in stay for MH/CD cases (Metropolitan Health Board 1977-1980). (The latter figures are not really comparable because the MHB data show declining stays for CD patients offset by increasing stays for MH patients, who account for about two-thirds of the MH/CD total. The HMO data indicate only one-third of the MH/CD patients in the Mental Health category.) A true change in practice pattern might also be expected to be associated with an increase in outpatient visits.

While the data on MH/CD ambulatory encounters are fragmentary, they indicate decreasing rather than increasing use. These patterns suggest that at least part of the decline in HMO use may be attributable to patients requiring MH/CD treatment switching to conventional plans with free choice of provider. Even the Physicians' Health Plan HMO, which includes over 1,200 physicians, limited access to its contracting psychiatrists by requiring all patients to be seen first by a single psychiatric clinic, which might then refer patients to other providers, yet was responsible for all MH/CD costs (Physicians Health Plan, 1980). Furthermore, as will be discussed below, the HMOs often have less comprehensive benefits for mental health and A/CD treatment than do conventional plans.

Trends in Hospital Use by Other Groups

The preceding discussion lumped together all types of non-HMO enrollees, yet there are two major subgroups that may be expected to exhibit different patterns. The first group is composed of Medicare and Medicaid beneficiaries and the uninsured. These people tend to be

relatively high users of medical care and they have very limited opportunities for enrollment in HMOs. Thus, the selection effect can be ignored when examining increases or decreases in their use. The second subgroup is composed of people with conventional insurance who are likely to have had a multiple choice option and thus, their experience may exhibit self-selection as well as competitive effects. If HMO competition leads providers to learn how to practice medicine more conservatively, some of this change in practice pattern may be visible in reduced use by Medicare or similar beneficiaries. This would be evidence supporting a cost-containing competitive effect. Alternatively, if utilization constraints by HMOs led to reduced hospital occupancy and patient loads for physicians, treatment of public patients might increase (Luft, 1980).

Medicare use and enrollment statistics suffer the same problem of multiple estimates as occurs for the total Twin Cities population. Tables 6 -8 present some of the relevant data. Discharges for Medicare aged beneficiaries in the seven county region increased from 72,915 in 1974 to 96,355 in 1978. This 4.7 percent growth is the result of a 2.6 percent increase for metro area residents and an 18.5 percent increase for residents from outside the seven county metro region. The more rapid growth in use by non-residents may partially reflect increased outreach by Twin Cities hospitals. It may also reflect more rapid growth of the aged population in outlying areas (See Table 7). For instance, the number of Medicare beneficiaries in the metro region grew by 7.8 percent between 1974 and 1979, yet this is composed of a 5.9 percent increase for Hennepin and Ramsey counties and a 21.1 percent increase in the remaining five counties.)

Table 6

MINNEAPOLIS-ST. PAUL MEDICARE UTILIZATION (MEDPAR DATA FOR AGED BENEFICIARIES)

	Patients Residing in MSP-HSA		Patients Residing Anywhere		Average Length of Stay		
	Hospitalized Anywhere	In HSA	Hospitalized in MSP-HSA	Out of Area Patients in MSP-HSA	MSP-HSA	Residents	Out of Area
Discharges							
1974	66,060	62,760	72,915	10,155	11.79	11.72	12.18
1975	65,920	62,435	73,355	10,920	11.59	11.62	11.44
1976	66,125	62,785	74,130	11,345	11.38	11.43	11.05
1977	65,395	61,995	74,415	12,420	10.91	10.94	10.78
1978	67,780	64,320	76,355	12,035	10.71	10.71	10.67
Percent change 1974-78	+2.6%	+2.5%	+4.7%	+18.5%	-9.2%	-8.6%	-12.4%
Days of Care							
1974	769,660	735,800	859,485	123,685			
1975	759,450	725,315	850,205	124,890			
1976	751,305	717,900	843,300	125,400			
1977	709,465	678,225	812,055	133,830			
1978	721,050	689,125	817,570	128,445			
Percent change	-6.3%	-6.3%	-4.9%	+3.8%			

Data are for HSA MN005 which includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties. Data relate to Medicare aged beneficiaries discharged from short-stay hospitals. See Lubitz, 1981 for a description of the data.

Source: U. S. Health Care Financing Administration, Office of Statistics and Data Management.

Table 7

Medicare Beneficiaries (Hospital Insurance)

By County of Residence, 1974-1979

Aged	Anoka	Carver	Dakota	Hennepin	Ramsey	Scott	Washing-ton	Total Aged	Aged & Disabled
1974	3,850	2,685	7,334	97,790	49,881	2,246	4,957	168,743	178,603
1975	4,065	2,712	7,697	98,575	50,760	2,293	5,083	171,185	182,572
1976	4,298	2,743	8,011	99,241	50,990	2,358	5,197	172,838	185,248
1977	4,587	2,789	8,360	100,936	52,356	2,488	5,436	176,952	190,575
1978	4,866	2,811	8,752	101,752	53,031	2,518	5,582	179,312	193,719
1979	5,115	2,921	9,196	102,769	53,606	2,567	5,715	181,889	196,720
Percent Change	32.9%	8.8%	25.4%	5.1%	7.5%	13.9%	15.3%	7.8%	10.1%

Disabled								Total Disabled	Disabled/ Aged & Disabled
1974	443	137	481	5,654	2,710	150	285	9,860	.055
1975	524	161	572	6,437	3,187	166	340	11,387	.062
1976	573	182	644	7,029	3,427	174	381	12,410	.067
1977	666	193	707	7,695	3,747	184	431	13,623	.072
1978	708	212	791	8,113	3,947	185	451	14,407	.074
1979	767	215	841	8,302	4,022	211	471	14,831	.075
Percent Change	73.1%	56.9%	74.8%	46.8%	48.4%	40.7%	65.3%	50.4%	

Source: US DHEW, SSA, ORS, Medicare: 1974 and 1975 Reimbursement by State and County, Pub No (SSA) 77-11717, 1977.
US DHEW, HCFA, ORDS, Medicare 1976: Reimbursement by State and County, HCFA, Pub No 018 (6-78)
US DHEW, HCFA, ORDS, Medicare 1977: Reimbursement by State and County, HCFA, Pub No 03001 (12-78)
US DHHS, HCFA, ORDS, Medicare: Health Insurance for the Aged and Disabled, 1978 and 1979, Reimbursement by State and County, HCFA, Pub No 03106, 1981.

The increase in Medicare admissions seen in Table 6 must be viewed against the backdrop of a more rapidly growing pool of Medicare beneficiaries (Table 7). On a per beneficiary basis, Twin City area residents enrolled in Medicare experienced a 3.4 percent decrease in use between 1974 and 1978. This decline is similar to the overall decline in admissions per capita in the Twin Cities during this period. If one divides all Medicare admissions in the Twin Cities hospitals by the resident Medicare population, then the relatively rapid growth in use by out-of-area beneficiaries results in only a 1.4 percent decline in Medicare admissions per resident Medicare enrollees. During this period the changes in total patient days for Medicare beneficiaries are even more remarkable. Hospital utilization for local residents fell by 11.9 percent and all Medicare use (with the resident population as a denominator) fell 10.5 percent, in contrast to a 4.7 percent decline in overall hospital use per capita.

Unfortunately, the HCFA Medicare data presented in Table 6 extend only through 1978. Another source of Medicare data is from the local Professional Standards Review Organization, the Foundation for Health Care Evaluation (FHCE). These data, as well as data from the Council of Community Hospitals, are presented in Table 8. With the exception of the COCH figures for 1978, which may be subject to coding errors, both sets of data indicate substantial increases in admissions and patient days. Although the FHCE and COCH data include disabled beneficiaries and differ in other ways, the contrast with the earlier data is not as great as might first appear. Upon closer examination, the HCFA data (Table 6) show a slow increase in admissions from 72,915 in 1974 to 74,415 in 1977 (a 2.1 percent

Table 8

Hospital Utilization by Medicare Beneficiaries

in the Minneapolis-St. Paul Area, 1977-1980

	FHCE Data [1]		COCH Data [2]	
	Patients	Total Days	Patients	Days
1977	83,224	897,847	82,497	888,456
1978	85,239	906,476	76,442	813,666
1979	85,072	929,318	83,439	909,653
1980	87,906	953,783	86,242	932,249

1. Foundation for Health Care Evaluation, personal communication from Stephen Foldes, January 8, 1982. These data are derived from discharge forms, rather than billing records as is the case for the MEDPAR data from HCFA. The FHCE data also refer to all Medicare beneficiaries, not just those aged 65 and over.

2. Council of Community Hospitals, 1981. These data are derived from the "expected source of payment" listed on the discharge abstract. The COCH includes all but three of the hospitals in the seven county area. See Johnson and Madson, 1981.

increase), followed by a 2.6 percent increase the following year. Similarly, patient days fell 5.5 percent between 1974 and 1977 only to rise .7 percent in 1978. Thus, the earlier set of data are consistent with declining use (admissions lagging behind enrollment growth and patient days actually falling) until 1977 with a relative increase in use beginning in 1978. Admissions outpaced enrollment between 1977 and 1978 and the increase in admissions by local residents more than offset an actual decline by out-of-area residents. The reversal in the trends for out-of-area residents is particularly noteworthy; it would almost appear as if the increasing use by local beneficiaries left no room for outsiders, yet the low occupancy rates in the area suggest another explanation must be found.

If one were to focus on only the 1974-77 Medicare data, then a case might be made for the presence of cost-containing competitive effect in which the growth and development of HMOs and the visibility given to cost-containing practices led conventional providers to cut back on hospital use. The fact that total days per thousand was dropping more rapidly for Medicare beneficiaries than for the area as a whole or even HMO enrollees would be perplexing, but might be explained by their starting from a much higher base. The 1977-1980 data tell a different story, and show rapidly increasing Medicare use consistent with an attempt by conventional providers to make up for patients lost to HMOs with an overall cost increasing effect. Competition in the Twin Cities has certainly increased in the last four years, so it is not reasonable to attribute the earlier decline in Medicare use to a competition effect and then posit a reversal

in that influence. Instead, the decline in Medicare use might be related to efforts by the PSRO or other similar activities essentially independent of the HMO phenomenon.

Data concerning hospital use by Medicaid recipients is even more scanty than for Medicare. As indicated in Table 9, total patients, patient days, and average recipients remained roughly constant between 1977 and 1980. While there is some year-to-year movement, it would be difficult to discern a clear trend in any direction. Furthermore, state decisions concerning eligibility and utilization review are likely to dominate any potential "spillover" effect.

Hospital utilization by enrollees with conventional reimbursement coverage will reflect a combination of a competitive cost containing effect and a selection effect. The latter will occur if HMOs differentially attract high or low utilizing people. Relative premiums and benefits will influence the nature and extent of the selection effect, but given the low and falling HMO utilization rates in the Twin Cities, many argue they attract relatively low utilizers. Data to test this hypothesis are difficult to obtain, but there are several bits of evidence supporting the contention that a selection effect exists.

Statewide figures for Blue Cross and Blue Shield of Minnesota subscribers indicate a U-shaped pattern in hospital use for the 1976-1980 period (Table 10). Discharges per 1000 fell from 136 to 133 by 1979 then returned to 136. Inpatient days/1000 fell from 906 in 1976 to 857 in 1978 and were back to 906 by 1980. While these data refer to statewide enrollment, they probably reflect to a substantial degree the Twin Cities pattern. The

Table 9

Estimated Hospital Utilization by Enrollees

in Blue Cross and Blue Shield of Minnesota, 1976-1980

	1976	1977	1978	1979	1980
Discharges/1000	136(E)	134(E)	134(E)	133(E)	136(E)
Days/1000	906(E)	891(E)	857(E)	876(E)	906(E)

Estimates are based on incurred days and effective months of coverage.

Source: Blue Cross and Blue Shield of Minnesota.

Table 10

Medicaid Hospital Use in the

Minneapolis-St. Paul Area, 1977-1980

	Patients[1]	Days [1]	Average Recipients[2]	Discharges/ 1000	Days/ 1000
1977	33,507	269,370	66,289	506	4,064
1978	29,593	245,252	66,364	446	3,696
1979	29,905	266,033	63,377	472	4,198
1980	31,431	271,244	66,180	476	4,099

1. Source: Johnson and Madson, 1981.

2. Source: Minnesota Department of Public Welfare, average daily caseloads for adults and children plus caretaker either receiving categorical aid or medical assistance only in Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties.

Table 11

Annual Admissions and Average Daily Census

For Community Hospitals in Hennepin and Ramsey Counties

	Admissions		Average Daily Census	
	Hennepin*	Ramsey	Hennepin*	Ramsey
1971	211,148	96,607	4,867	2,402
1972	210,379	95,240	4,788	2,328
1973	215,175	95,645	4,808	2,279
1974	221,696	98,148	4,916	2,288
1975	223,094	96,123	4,883	2,261
1976	226,828	96,330	4,980	2,223
1977	225,683	93,797	4,963	2,175
1978	222,002	92,402	4,935	2,070
1979	221,143	86,967	4,957	1,974
1980	221,665	88,456	4,974	2,009

* These data include two hospitals (Unity and Mercy) which are located in Anoka county but are part of Health Central which reports combined data for its hospitals, the third of which, Golden Valley, is located in Hennepin county.

Source: American Hospital Association, Guide to the Health Care Field, Annual. See notes to Table 2.

census over the 1971-80 period. Admissions to hospitals in Hennepin County rose through 1976 then fell by about 5,000 to a level about 10,000 (or 5 percent) above their 1971 level. Admissions to hospitals in Ramsey County were nearly constant through 1976 and then fell by about 8,000 (or 9 percent) below their previous level. With only 27 percent of all metropolitan area admissions in 1976, Ramsey County hospitals accounted for 60 percent of the decline in admissions between 1976 and 1980. (Choosing 1979 as an endpoint would make the comparison even more noteworthy.) A similar, even more extreme difference occurs with respect to average census. Hospitals in Hennepin County exhibit a small increase in census during the first half of the decade followed by a plateau, while Ramsey County hospitals show an almost continuous decline. Between 1976 and 1980, hospitals in Ramsey County accounted for 88 percent of the decline in the metropolitan area census even though they represented only 29 percent of the patients in 1976. The decline in hospital use in Ramsey County is probably due to population shifts. Population fell from 476,255 in 1970 to 459,784, a decline of 3.5 percent during the decade in contrast to a drop from 960,080 to 941,411 for Hennepin County, a decline of slightly less than 2 percent. Intercensal population estimates seem too unreliable to calculate changes for shorter periods.

Even though population movements may be a major factor in the changing hospital use patterns, one may ask what additional influence HMO competitive effects had. HMO enrollment data by county are not available, but it is possible to piece together some estimates of where the major effects are likely to be felt. The largest HMO, Group Health Plan, has

only three of its ten medical centers in Ramsey County, even though the plan began in St. Paul. The second largest group practice, MedCenter Health Plan, has its primary location in St. Louis Park, west of Minneapolis in Hennepin County, and satellite clinics in Scott and Anoka Counties. Collectively, these three sites account for 88 percent of the enrollment, with the remaining twelve percent spread over a network of twelve eastside physician groups, many of which may be in Ramsey County (Anderson, Herold and Foldes, 1980). Physicians Health Plan, which moved from third to second in enrollment between 1979 and 1980, is sponsored by the Hennepin County Medical Society and, while enrollment breakdowns are not available, in 1980 only six percent of PHP physicians practiced in Ramsey (Anderson, Herold and Foldes 1980). HMO Minnesota is IPA-type of HMO, sponsored by Blue Cross and Blue Shield of Minnesota, had 48,309 enrollees in 1980 and of its 623 participating physicians, 45 percent were in Ramsey County and 36 percent in Hennepin County. Share Health Plan is based at Samaritan Hospital in St. Paul, but 46 percent of its physicians practice in Hennepin county. On the other hand, all of Nicollet-Eitel's physicians are in Hennepin and the physicians of Coordinated Health Care are split nearly evenly between Ramsey County and Washington County to the east.

While it is difficult to summarize these data, it appears that Ramsey County has less than its proportionate share of HMO enrollees. Ramsey County hospitals had only 21.8 percent of all HMO patients in 1978 in contrast to 27 percent of all patients (Metropolitan Health Board patient origin survey, November 1978). Furthermore, only one of the Ramsey County

hospitals had a substantial proportion of its patient load attributable to HMOs--Samaritan, a 150 bed hosptial with a 28 percent occupancy rate, of which about one third were HMO members (Metropolitan Health Board, 1981). (Share has since terminated its contract with Samaritan (Yanish, 1981). Based upon the Metropolitan Health Board HMO market share data and annual discharge rates, the 33.6 percent HMO share at Samaritan implies 692 discharges, whereas there were many more discharges in certain Hennepin County hospitals. HMO enrollees accounted for 43.2 percent of Fairview-Downtown (5,887 discharges), 12.9 percent of Eitel (624 discharges) and 11.6 percent of Methodist (2,130 discharges).*

The concentration of HMO patients in selected hospitals is superimposed on a shifting hospital market. Minneapolis-St.Paul hospitals are highly concentrated in the downtown areas of the two cities. Population growth has been in the suburbs, and some hospitals, such as Mt. Sinai, have seen their traditional patient markets move out of their neighborhoods. The shift in locus of treatment may even have an impact in utilization as people move to more modern facilities. Without diagnosis-specific data, one cannot test the hypothesis that the suburban facilities have different practice patterns. Some data, however, suggest that this may be the case, at least for maternity services. In 1980, length of stay in obstetrics units in Ramsey County and Minneapolis hospitals were 4.1 and 4.2 days, respectively. In suburban Hennepin County stays averaged 4.0 days and in

*These MHB data also suggest that most of the Group Health Plan enrollees are from Hennepin county; less than 10 percent of the Fairview patient days were from the city of St. Paul (Metropolitan Health Board 1981).

the other five suburban counties stays were 3.6 days. The shorter stays in the outlying counties occurred in spite of markedly lower occupancy rates -- 58 percent vs. 61.0, 65.9 and 76.7 percent for Ramsey, Minneapolis and suburban Hennepin counties, respectively (Metropolitan Health Board, 1980). The low occupancy suggests that pressure for beds did not cause the shorter stays. It may be the case that newer practitioners in the growing suburbs have more conservative or cost-conscious practice styles.

The Twin Cities area has also witnessed a very rapid increase in non-emergency room hospital outpatient visits. Between 1972 and 1980, such visits increased by 17 percent for all U.S. community hospitals in contrast to 101 percent for Minneapolis-St.Paul (American Hospital Association, Hospital Statistics, 1973,1980). There are several potential explanations for this enormous relative growth in the Twin Cities. One is the expansion in 1976 of alcoholism/chemical dependency coverage to outpatient services. Between 1976 and 1980, Blue Cross and Blue Shield of Minnesota (BCBSM) has seen a 10-12 percent shift in place of service for its psychiatric and A/CD treatment away from an inpatient setting (Jackson-Beeck, 1981a). A second explanation is that until recently the Minnesota Medicaid program was paying hospitals on a charge rather than cost basis for outpatient visits. Because charges usually exceed costs, and Medicaid payments are usually even less than costs, this created a clear incentive to concentrate patients in outpatient centers (McInerney, 1981).

A third potential explanation is the increasing use of outpatient surgery. A free-standing surgery center opened in 1978 in St. Paul and as of 1981 was the location for about 3,330 operations per year (Hoose, 1981).

While this is an insignificant fraction of the 195,791 operations performed in Twin Cities hospitals, the free-standing center may have had a much more substantial competitive effect on local hospitals (American Hospital Association, Hospital Statistics, 1981). BCBSM reports 10,813 outpatient surgery claims submitted by Twin Cities hospitals in 1980 (Jackson-Beeck, 1981). On the assumption that BCBSM enrolls about a quarter of the insured population and that its enrollees' use is roughly representative, then about 40,000 operations or 20 percent of all surgical procedures reported by Twin Cities hospitals were done on an outpatient basis. This percentage is substantially lower than that reported by some HMOs, but it is nonetheless an impressively large fraction (Marks et al., 1980). If it has increased markedly in recent years, it may help explain some of the increase in outpatient use and, more importantly, some of the decline in hospital admissions. A recent proposal to open a second free-standing center in Minneapolis drew vigorous opposition from local hospitals who pointed to their own expanding outpatient surgery centers. Two hospitals sent letters of intent to set up separate affiliated units (Cope, 1981c). It is important to note that the total decline in Twin City hospital admissions in the late 1970's is in the order of 15,000, less than 40 percent of the annual number of outpatient surgeries in the area.

The Nature of Competition in the Twin Cities Market

The medical care market in Minneapolis-St.Paul has several competitive features that may or may not result in lower costs or utilization of services.

The local HMOs are clearly engaged in a competitive process with conventional reimbursement-type plans and with each other. Hospitals have found themselves with excess capacity and compete with each other for patients and physicians. Hospitals are also competing with free-standing centers for surgical, psychiatric, and alcholism/chemical dependency patients. Physicians are in competition with HMOs and with each other for patients.

Christianson and McClure (1979) describe the competitive process in which the HMOs are engaged. It is difficult to evaluate or even describe the process fully both because it is still unfolding and because the competition itself leads its participants to be reticent. HMOs clearly have incentives to constrain costs for their enrollees, and the rate of growth in premiums for HMOs has been slower than for other insurers. However, there is some evidence that these lower costs reflect not only cost-containing practice patterns, but also selective enrollment. For instance, Physicians Health Plan (PHP) cancelled its contract with the Control Data Corporation because maternity use was too high (Matlock, 1980). PHP also obtained waivers from the state to avoid taking new enrollees for the current open enrollment season for Hennepin County employees because the rapid increase in BCBSM rates made PHP fear adverse selection (Kelly, 1981). Of course, BCBSM has also claimed adverse selection and presents data showing low utilizing enrollees are the first to leave for the HMOs (Halvorsen, 1981; Gjelten, 1980).

Historically, most HMOs have offered more comprehensive benefits than conventional plans at comparable or lower price, but with a restriction on choice of providers. This restriction is an important factor in choice of

coverage, and it has probably resulted in a tendency for persons with strong physician ties, perhaps because they were in treatment, to stay with their conventional coverage (Berki and Ashcraft, 1980). HMOs have also been known to choose the employee groups to which they will market, probably because their community rate would be too high for those with the youngest employees and too low to cover the expenses of firms with a very old employee group. Twin Cities HMOs, however, generally do not use a strict community rating system. Two HMOs, Physicians Health Plan and Coordinated Health Plan, use experience rating, while HMO Minnesota, MedCenter, and Nicollet-Eitel adjust their "community rate" to reflect factors such as group size, family size, category of employer, or age composition (Anderson, Herold and Foldes, 1981). This pattern is likely to foster much more aggressive marketing behavior.

The Twin Cities HMOs provide very comprehensive coverage of hospital and physicians' services, but there are non-standard benefits on which coverage varies widely. In some cases, such as dental coverage for children, the effect will be to attract families with young children. In other cases, many of the HMOs have limited benefits for alcoholism/chemical dependency and such benefits may be less than those mandated for conventional reimbursement-type plans. Minneapolis-St. Paul residents are well informed about HMO choices, partly because of numerous articles in major newspapers such as the Minneapolis Tribune. One full-page article provides a 15 point check-list format for comparing HMOs (Cope, 1981). Two of these points are "Do you or any member of your family expect to need any

mental-health or chemical dependency treatment services?" and "Are you planning to undergo non-emergency surgery?" It is pointed out that if the answer to either is yes, conventional coverage may be better. These coverage differences could help explain why mental health and A/CD days per 1,000 are much higher for BCBSM enrollees than for HMOs (Jackson-Beeck, 1981a).

Hospitals in the Twin Cities area are in a competitive struggle for patients. Many have developed contracts with HMOs, primarily to attract or keep patients, yet in all but a few instances the impact of these contracts is small (Kralewski and Countryman, 1981). Group Health Plan shifted its patients from Mt. Sinai to Fairview Hospital in order to obtain lower costs. Mt. Sinai continues to have low occupancy and high costs and the Metropolitan Health Board recommended its closure. In the highly charged political battle which ensued, Mt. Sinai and the other two hospitals slated for closure won their battle to remain open in a competitive market. In fact, the prestigious Citizens League that helped establish the Metropolitan Health Board has now come out against health planning and for a competitive model in medical care (Citizens League 1981). This echoes earlier statements by the Minnesota Medical Association's Commission on Health Care Costs (1979) and the Minnesota Coalition on Health Care Costs (1981).

One of the problems with the current emphasis on competition is that there is little evidence yet that it contains costs. HMOs are obtaining discounts from hospitals, but hospital administrators do not report any

changes in procedures or practices to lower costs (Kralewski and Countryman, 1981). If true, the discounts must imply higher charges for others, such as Blue Cross and commercial insurers. Reduced utilization of hospital beds--for whatever reason--has been largely offset by increased use for mental health and alcoholism/chemical dependency. Some hospitals, such as the University of Minnesota Hospital are developing referral relationships with small hospitals outside the metropolitan area. While this will certainly be appropriate for selected tertiary care problems, the expensive metropolitan hospitals also treat a great many uncomplicated patients. In spite of all the competition discussion, major new construction plans have been announced by University Hospital, the VA Hospital, Bethesda, and St. Johns.

Thus far, little has been said about physicians and how they may react to increased competition in the Twin Cities. The growth of prepaid group practices draws patients into self-contained groups while leaving a smaller number available for the ever increasing pool of independent fee-for-service practitioners. The resulting revenue loss can be compensated for in several ways: forming a new HMO to attract a segment of the remaining market for a proportionately smaller segment of the physicians, increasing fees, or increasing utilization. The Physicians Health Plan HMO was an example of the first strategy, but because it included most physicians in the area, it was not spreading the revenue over a smaller physician denominator, and costs remained high until relatively draconian utilization and fee controls were imposed in late 1979 (Physicians Health Plan Staff,

1980). While the cost and use picture at PHP has improved recently, it is unclear how much of this is the result of cost-containment efforts and how much is the result of a strategy of dropping contracts deemed too costly and instituting cutbacks in benefit coverage.

Even if the Physicians Health Plan did achieve major changes in use patterns through prior authorization, concurrent review, and disciplinary action, what effects would this have on people not enrolled in the HMO? One possibility is that physicians, having learned how to practice conservatively for their PHP patients, would transfer those practice patterns to all their other patients. Note, however, that such a shift would reduce the physicians' income without the compensating profit sharing attainable through an HMO. A second possibility is that because their income from HMO patients is reduced, practitioners increase services for other patients, such as Medicare beneficiaries.* A third possibility is that the change in practice patterns is experienced by only a small fraction of physicians who account for a substantial amount of the costs and most practitioners are unaffected. While it is difficult to choose among these alternatives, there is some evidence to support the third. In 1979, of 1,214 physicians associated with PHP, 91 percent did not state the proportion of their practice which was prepaid, but it was likely to be small, and the remaining nine percent had less than 10 percent prepaid patients. A similar pattern exists for physicians affiliated

*One need not ascribe unseemly or income maximizing motives to explain this behavior. As physicians find themselves spending less time on some patients, they will naturally have more time available to care for their other patients and be able to perform an additonal test or two to be more certain of a diagnosis or recommend a procedure that would be postponed if their schedules were full.

with HMO Minnesota, the other IPA (Anderson, Herold and Foldes, 1981). A recent survey of all Twin Cities physicians shows that two-thirds had 10 percent or less of their patients prepaid (Foldes 1982). In fact, the Physicians Health Plan Staff notes that "for the majority of the plan's participating doctors, hospital controls had no practical impact--little of their practice involved treating patients in the hospital; still less involved PHP members." (1980)

The significant changes in hospital use by Medicare beneficiaries is an important part of the Twin Cities story. The substantial decline in the 1974-1977 period is clearly the opposite of a cost shifting response, but it seems unlikely that this reduction is attributable to competition largely because it predates much of the HMO growth. Instead, credit might be given an active PSRO program, utilization review by hospitals, and other more direct effects. In particular, it would seem strange that while the Physicians Health Plan struggled until 1978 to control use for its own enrollees, it was having a dramatic indirect cost-containing impact on Medicare since 1974. The increase in Medicare use since 1977 may actually be an indication of a cost increasing aspect of HMO competition.

A final perspective on the competitive market is that of employers who, if a cost-containing effect is taking place, should be observing a slowing in the increase in the health benefits costs. Instead, the opposite effect seems to be occurring, at least in selected instances. Some firms have found that after three or four years of multiple choice,

the conventional insurance option is left with a high cost uninsurable pool and that this has increased, rather than decreased total costs (Peterson, 1981). Honeywell, one of the major backers of HMOs, seems to have experienced high costs, due at least in part to favorable selection of enrollees into HMOs while its experience-rated indemnity plan is left with high cost enrollees (Ronis, 1981). Unfortunately, the self-selection of enrollees into different plans is consistent with both lower premiums and costs for some and higher total costs--just the opposite of a cost-containing competitive response.

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Chapter 6

Effects of Competition by HMOs on Hospital Utilization*

Will competition contain health care costs? This question underlies the current policy debate for a medical system that now absorbs 10 percent of the gross national product and has expenditures that continue to rise at a rate up to double that of inflation. Those concerned with the health care dollar--primarily government payors, health insurance companies, employers paying for fringe benefits, and, increasingly, the public--are seeking ways to control those rising costs.

While some have studied the effects of increased consumer cost sharing (Newhouse et al., 1981) or utilization review programs, one approach to cost containment that has gained prominance recently is that of encouraging competition among various health care delivery systems (Enthoven, 1980; Iglehart, 1981). The concept is based on the assumption that the growth and development of prepaid plans, such as health maintenance organizations (HMOs) will foster cost-containing responses by conventional fee-for-services insurers and providers. Numerous studies have demonstrated that HMO enrollees incur medical care costs that are 10 to 40 percent lower than the cost of fee-for-service health care (Luft, 1981a). The bulk of these savings result from lower rates of hospital admission, often the most expensive portion of the medical bill. Combined with the fact that prepaid plan benefits are usually more comprehensive, the enrollee's lower costs reflect minimal out-of-pocket payments and, frequently, lower insurance premiums.

If health maintenance organizations are providing care at lower cost, it would be anticipated that they would gain enrollment at the expense of conventional providers. This, then, might induce a competitive

*by Susan C. Maerki and Harold S. Luft.

response by conventional providers to retain their patients. An antagonistic, adversarial, and litigious history of attempts to deny medical society membership and hospital privileges to doctors involved in group practice and prepayment arrangements characterized the early relationship between fee-for-service providers and health maintenance organizations. Court decisions have removed many of the non-market responses, but other avenues of competition remain. These competitive responses may take the form of increased advertising, improved benefits in conventional health insurance packages, or service amenities such as extended office hours, claims submittal by the provider, or waiver of copayments and deductibles. If a market area's HMO enrollment is growing rapidly, physicians and hospitals may try to compensate for the loss of patients by scheduling more return visits, ordering more tests, or admitting more patients to the hospital. Such responses would increase costs for conventional coverage and might not be tolerated if enrollees are sufficiently price sensitive.

Alternatively, insurers may implement restrictive utilization review, provide incentives for outpatient care, and convince providers that their long term survival requires a cost-containing response. The emergence of preferred provider organizations, which are based upon contracting with select physicians and hospitals at discounted rates and incorporating those savings into insurance benefit packages, is only the most recent example of a cost-containing effort (Trauner, 1983). Inasmuch as this may still be a period of short-run adjustment to HMO growth, theoretical arguments are of limited usefulness. The results of empirical analysis must be relied upon to identify support for either cost-containing or cost-increasing responses.

The possibility of cost-containing effects through reduced hospitalization for non-HMO enrollees has been suggested in two empirical studies, subsequent case studies, and in anecdotal accounts. In a study of differences in 1967 hospital utilization across standard metropolitan statistical areas (SMSAs), Chiswick (1976) entered the presence of an HMO in a state as a variable in his admission rate equation and found a weakly significant negative effect. In his long run equation, HMO presence in a state had a strong negative effect on bed supply in the SMSA. Later, Greenberg and Goldberg (1980) investigated the effect of market share on statewide hospital utilization by Blue Cross enrollees. They found a significant negative effect, implying lower Blue Cross hospital utilization in areas having larger HMO market shares. This result was supported by interviews with insurers and hospital administrators conducted in nine areas in which there was substantial HMO enrollment (Greenberg and Goldberg, 1977). These empirical results, however, may have been confounded by the special characteristics of Hawaii, California, Oregon, and Washington with their higher than average market shares of HMOs.

The Greenberg and Goldberg results suggest that hospital utilization by Blue Cross enrollees is lower in states having a significant HMO market share. Lacking Blue Cross enrollment and utilization data for smaller areas which more accurately reflect a health care market area, the hypothesis of lower utilization by non-HMO enrollees can be tested by a simple comparison of hospital utilization data that includes or excludes the local HMO enrollees.* Hospital utilization in an area where there

*Utilization data of Blue Cross and other carriers are subject to substantial errors in the estimates of enrollment (Luft and Maerki, 1982). This suggests that such data may not be preferable even were they available.

is an HMO, measured by the patient days per thousand population, reflects the weighted effect of utilization by people with no insurance, with conventional insurance, and with coverage through a health maintenance organization. If HMOs actually reduce hospital use by their enrollees, this will be reflected in total utilization, and the average rate will vary inversely with the percentage of people enrolled in the HMO. The test of the competitive effect occurs when HMO utilization is removed from the hospital utilization data and HMO enrollees are subtracted from the population base used to calculate the utilization rate. If after this adjustment, higher HMO market shares are negatively related to utilization of non-HMO enrollees, it may then be possible to conclude that there is a cost-containing competitive effect.

Methodology

Both Chiswick and Greenberg and Goldberg used a single cross section with rather crude measures of the HMO variable. Chiswick included a 0,1 variable to indicate the presence of an HMO in the state in which the SMSA was located. Although many states had no HMOs, this approach assigned a positive value to SMSAs regardless of whether HMOs enrolled any people in the area. Greenberg and Goldberg defined the HMO market share as HMO enrollment divided by the insured population in the state. This refinement, although an improvement, also neglects the fact that HMO enrollment is likely to be concentrated in specific geographic areas of the state. Another problem is that the study uses insurance coverage estimates provided by the Health Insurance Association of America. Primarily because

of the growing number of families that have multiple policies, these estimates bear little relationship to true coverage levels (Luft and Maerki, 1982).

In order to approximate a medical care market area and to include observations for areas on the West Coast that do not have an operating health maintenance organization, SMSAs were selected as the unit of observation. Data from the Area Resource File include such health care variables as distribution of hospitals by bed size, control, and occupancy, total admissions, and physician to population ratios. Additional information was derived from the City and County Data Book, the American Hospital Association, the American Medical Association, and Vital Statistics of the United States. HMO enrollments and days per thousand were taken from the "Summary of the National Census of Prepaid Plans--1976." A total of 258 SMSAs were included in the original data set, but 14 were excluded from the final analysis due to missing data or extreme values, and 15 HMOs were excluded because they were not located within an SMSA.* Because any competitive effect is likely to take time to have an impact on utilization, we used 1976 HMO enrollment to avoid including observations in which very recent HMO growth would show up in the HMO variables but be unlikely to have affected the conventional system.

Specification of the Model

Research examining the development of HMOs (McNeil and Schlenker, Keller, ICF, InterStudy) has found certain factors to be associated with

*SMSAs with extreme values on hospital days per 1000 were almost always relatively small cities, such as Ann Arbor, Michigan, having major referral hospitals, state hospitals, or Veterans' Administration facilities.

their establishment and growth in a market area while other conditions were considered barriers to the emergence of prepaid health plans. In general, HMO presence and growth has been positively associated with a high physician-to-population ratio, a large proportion of physicians practicing in groups, the presence of large employers offering generous fringe benefit packages, and a young, mobile population. Union representation may help promote health maintenance organizations if bargaining agreements have established a generous standard of health benefits, but they may be an impediment where an employer's offering conflicts with negotiated contracts. Because of the requirements of the HMO Act of 1973, HMO benefit packages in 1976 are usually more comprehensive and, therefore, often more expensive. This implies that above average per capita income and a lower proportion of poor or elderly may encourage HMO growth.

Recognizing that certain market characteristics that are conducive to HMO growth and development may also be related to hospital utilization and because the empirical focus is on whether hospital utilization is associated with HMO market share, a simultaneous equation model is appropriate. (In fact, Goldberg and Greenberg (1981) found that HMOs were more likely to develop in areas with high hospital costs.) Because the 1976 data primarly measure the older and larger HMOs, some that have existed since World War II, it is difficult to obtain valid empirical estimates of the health care market situation prior to their development. However, the model includes an equation predicting HMO market share in 1976 as a function of HMO presence in 1970 (HMOPRS70), hospital beds in 1970

(GBEDRT70) and patient days per 1000 population in 1970 (GDAYRT70), and other market variables. Similarly, the presence of HMOs may have the long run effect of encouraging hospitals to reduce their bed supply. Thus, beds per capita in 1975 (STBDS76) are a function of GBEDRT70 and HMOPRS70, as well as selected market characteristics. Finally, patient days per capita in 1975 (AHADAY75) are considered to be a function of the estimated values of HMO market share 1976 and estimated beds per 1000 in 1975. This same equation is also specified but with a dependent variable of patient days per capita in <u>non</u>-HMO enrollees. Definitions for the variables are listed in Table 1 and the full set of equations is outlined below:

1. $\text{HMOSHR76} = a + b_1\ \text{GBEDRT70} + b_2\text{GDAYRT70} + b_3\text{MDMSGRP70} + b_4\text{UNION74} + b_5\text{POPSQMI} + b_6\text{PRVTCVRG} + b_7\text{HMOPRS70}$
2. $\text{STBDS75} = a + b_1\text{GBEDRT70} + b_2\text{FEDBED70} + b_9\text{GNLGT400} = b_{10}\text{PRVTCVRG}$
3. $\text{AHADAY75} = a + b_1\text{HMOSHR76} + b_2\text{STBDS75} + b_3\text{JANTEMP} + b_4\text{BRTHRT70} + b_5\text{PCTNWHT} + b_6\text{OVR65PCT}$
4. $\text{AHAWOHMO} = a + b_1\text{HMOSHR76} + b_2\text{STBDS75} + b_3\text{JANTEMP} + b_4\text{BRTHRT70} + b_5\text{PCTNWHT} + b_6\text{OVR65PCT}$

The first equation, HMO market share in 1976, essentially uses variables that other researchers have found to be related to HMO growth. The effect of the extent of unionization may be either positive or negative. High population density makes it easier to market prepaid group practice HMOs (by far the dominant form in 1976) because of the travel times associated with centralized facilities. The proportion of the population with private health insurance is a general measure of coverage in the area.

Table 1

Variables Used in the Regression Models

Dependent Variables		Mean
HMOSHR76	: HMO market share in 1976	.013
STBDS75	: Non-federal short term general hospital beds/1000 population -1975	4.67
AHADAY75	: Non-federal short term general hospital days/1000 population - 1975	1260
AHAWOHMO	: Short term general hospital days/1000 population minus HMO utilization and enrollment	1269

Independent Variables		Mean
GBEDRT70	: Short term general hospital beds/1000 population - 1970	4.79
GDAYRT70	: Short term general hospital days/1000 population - 1970	1352
MDMSGRP70	: % MDs in multispecialty group practice - 1970	.103
MDPTC70	: % MDs in patient care - 1970	.549
UNION74	: % nonagricultural workers in unions - 1974	.275
POPSQMI	: Population/square mile	25.3
PRVTCVRG	: % under 65 population with private insurance coverage	.782
FEDBED	: % of hospital beds in federal short term hospitals	.092
GNLGT400	: % of hospital beds in institutions with 400+ beds	.177
JANTEMP	: Average January temperature	36.1
BRTHRT70	: Birthrate - 1980	15.9
PCTNWHT	: % of population nonwhite - 1970	.108
OVER65PCT	: % population over 65 - 1970	.093
HMOPRS70	: HMO presence in 1970	.099

244 observations

The second endogenous variable is the bed rate. Accepting Chiswick's argument, in the long run lower utilization due to an increasing market share of HMO enrollees may lead to a reduction in hospital beds. This might occur by denying expansions, converting acute care beds to other uses, or by closing units and hospitals. But hypothesizing this direct effect ignores the fact that all hospital beds are not perfect substitutes for one another. In the most simple case, a maternity bed is not a substitute for a psychiatric bed or a bed in a special care unit. A similar logic applies to distinctions between short term federal hospitals, state and local government hospitals, and voluntary hospitals. Different patient populations may be admitted to each type of hospital, and this implies that, even if there appears to be excess capacity in the system, all the resources cannot be considered equivalent. Another caveat in interpreting a change in the bed-to-population ratio is that occupancy planning can affect the bed rate. All hospitals must maintain a certain number of usually empty but staffed beds to assure space for emergency patients, but in a small hospital guaranteeing that there will be an available bed requires that a higher percentage of the beds remain unoccupied. Large hospitals can maintain a high occupancy rate and still have emergency beds available.

The estimated values for HMO market share and short term general hospital beds are then inserted into an equation predicting the patient day rate. Other variables include the distribution of hospitals by bed size and occupancy, percent with private insurance coverage, median income, percent non-white, birth rate, and January average temperature. The

dependent variable of days/1000 in short term general hospitals is calculated in two ways. In the first case, all patient days for the total population are used to determine the days rate. In the second case, the same equation is specified, but the utilization rate subtracts HMO days from the numerator and HMO enrollees from the denominator, leaving a utilization rate for non-HMO enrollees.*

The variables used to estimate the total utilization rate and the non-HMO utilization rate have been used in other research. Median income and percent non-white are indicators of health status and demand. Those with higher median income are presumed to purchase a lifestyle--food, shelter, preventive care--that leads to an improved health status and lower use of the hospital. This may be partially offset by their ability to pay for additional elective or marginal procedures that would lead to increased demand. The percent non-white indicates the porportion of people who have poorer health status and who, when they enter the hospital, may have a longer average length of stay. The birth rate is used to indicate maternity admissions that greatly affect the total hospitalization rate and are not expected to be reduced by either HMOs or other cost-containment efforts. (Length of stay for such admissions, however, is typically brief and is also subject to cost-containing incentives.) In the warmer climates of the South and major portions of the West, patients average fewer days in the hospital. This last variable was used by both Chiswick and Greenberg and Goldberg with differing interpretations.

*HMO enrollment and days per 1000 enrollees is given in the HMO Census. For Kaiser in northern and southern California, enrollments were estimated on a county basis and allocated to the appropriate SMSAs.

Results

The final forms of the four equations are displayed in Tables 2 through 5. All observations are weighted by the square root of the population to correct for heteroscedasticity.

In the HMO market share equation, physicians in group practice, HMO presence in 1970, and population density are positively related, while private insurance is negative, and all are highly significant. ($P \leq .01$). The remainder of the variables, physicians in patient care, percent union representation, and the lagged utilization variables, beds/1000 in 1970 or days/1000 in 1970 are only slightly less significant ($P \leq .05$).

In the second equation, short term general hospital beds/1000 is positively and significantly related to beds/1000 in 1970, percent high occupancy hospitals, percent large hospitals, and percent with private insurance ($P \leq .01$). HMO presence in 1970 is positive and indicates that metropolitan areas with HMOs have .2 additional beds per capita--about 4 percent relative to the mean. Not surprisingly, the number of beds in 1970 is the most important predictor.*

In the third equation, with total days/1000 in short term hospitals as the dependent variable, the estimated HMO market share, is negative but not significant. The bed rate, percent non-white, average January temperature, and the birth rate are highly significant ($P \leq .01$), while percent of the population over age 65 is slighly less significant

*The two bed variables are slightly different. The 1970 figure includes federal hospitals, while the 1975 figure does not. This explains the highly significant negative effect of FEDBED70.

Table 2

Dependent Variable

HMO Market Share in 1976

Variable	Coefficient	T-Ratio
GBEDRT70	.0101	2.01*
GDAYRT70	$-.3 \times 10^{-5}$	-1.96*
MDMSGRP70	.0186	1.90
UNION74	.0663	2.10**
POPSQMI	.0002	3.56**
PRVTCVRG	-.2116	-4.05**
HMOPRS70	.0731	11.06**
INTERCEPT	.1053	2.47**

$R^2 = .587$

Observations are weighted by the square root of the population.

*$P \leq .05$

**$P \leq .01$

Table 3

Dependent Variable

Short Term Hospital Beds/1000 Population in 1975

Variable	Coefficient	T-Ratio
GBEDRT70	.7200	20.46**
FEDBED70	-3.8448	-11.70**
GNLGT400	.6259	2.72**
HMOPRS70	.2042	2.03*
INTERCEPT	1.4914	9.15**

R^2 = .675

Observations are weighted by square root of the population.

*$P \leq .05$

**$P \leq .01$

Table 4

Total Population Utilization

Dependent Variable

AHA Days/1000 Population in 1975

Variable	Coefficient	T-Ratio
Est.STBDS75	237.44	5.42**
JANTEMP	-4.72	-5.73**
BRTHRT70	-11.72	-5.09**
PCTNWHT	714.40	6.69**
OVR65PCT	739.45	2.13**
Est.HMOMKT76	-368.44	-1.88
INTERCEPT	362.83	5.42**

R^2 = .811

Observation weighted by the square root of the population.

*P $\leq$ .05

**P $\leq$ .01

Table 5

Dependent Variable

Non-HMO Enrollee Utilization

AHA Days/1000 Population Minus HMO Utilization

Variable	Coefficient	T-Ratio
Est.STBDS75	242.11	23.36**
JANTEMP	-4.38	-5.21**
BRTHRT70	-12.65	-5.36**
PCTNWHT	704.58	6.46**
OVR65PCT	808.99	2.28*
Est.HMOMKT76	316.83	1.58
INTERCEPT	339.27	4.95**

R^2 = .803

Observation weighted by the square root of the population.

*P $\leq$ .05

**P $\leq$ .01

($P \leq .05$). When HMO utilization is removed from the dependent variable, the coefficient for the estimated HMO market share shifts from negative to positive and attains significance ($P \leq .11$). All other variables remain comparable.

Discussion

Estimation of the two endogenous variables, HMO market share in 1976 and the short term bed-to-population ratio, are not the major focus of this research but are of interest to compare to prior work on HMO growth and development. In the first equation, the medical care market variables are all predictive of HMO market share, particularly HMO presence in 1970 and the proportion of physicians in multi-specialty medical groups. HMO market share is positively related to beds per capita and negatively related to patient days per capita. This might be interpreted as a competitve impact on use that has not been reflected in capacity. (Such an interpretation, of course, requires reversing the dependent and independent variables.) Alternatively, the days rate may be picking up the shorter average length of stay in the Western states, the states with the greatest HMO market share. The positive and significant coefficient on percent unionized workers supports the interpretation that workers may be attracted to the more comprehensive benefits. It may also represent the plan marketing strategies. The results of Keller, who found union workers to have no effect on HMO presence in 1970 and to be negatively related to growth from 1970 to 1976, may be due to differences in the insurance and other variables.

After testing many insurance variables, including percent with no insurance and coverage under Medicaid and Medicare, we found private insurance coverage to be most strongly associated with HMO market share. Insurance coverage is a problematic variable because direct estimates are not available at an SMSA level. Our variables are derived from state data from the 1976 Survey of Income and Education. Regressions were estimated using state observations with measures of occupational structure, income, and earners per family (Luft and Maerki, 1982). The estimated coefficients were then used with SMSA values to derive SMSA-specific figures. HMO enrollees are typically included in the private coverage figure, so the negative coefficient is probably capturing some other unmeasured factor.

In the second equation, short term beds per 1000 population, the HMO variable is positive and significant. In his long run beds equation, Chiswick found HMO presence in the state to have a negative but insignificant effect on bed supply. Thus, our results cannot support his hypothesis that adjustments to lower utilization by HMO enrollees may lead to reductions in the number of beds. Given the time necessary to effect changes in capital stock, it may simply be that the lags are longer than are implicit in our model. However, since we have focused on the large, more mature HMOs existing in 1976 (the average plan had been in operation for 10 years) this suggests that the lags may be so long as to be irrelevant from a policy perspective. Joskow (1980) also found that HMO presence was positively associated with a larger average reserve margin (beds minus average daily census) and a larger bed supply. He argued that hospitals may not decrease beds to decrease costs in order to attract the

HMO enrollees back to fee-for-service medicine or to encourage hospital affiliation with prepaid health plans. Rather, he speculates that the presence of an HMO may encourage non-price or quality competition. Staffing additional beds for emergency patients, enlarging intensive care units, and designating specialty wards will increase the bed supply as the level of perceived quality is improved.

As the final step, the estimates of HMO market share and bed supply are inserted into a patient day rate equation. The coefficients on the general market characteristics are all significant and remain essentially unchanged regardless of whether the utilization measure includes or excludes utilization of the HMO enrollees. Lower average January temperature is negative and is probably picking up a regional effect, such as the shorter length of stay in the Western region. The result also supports an interpretation that those in colder climates may be more sickly when they enter the hospital or that they are kept longer to assure complete recuperation. Negative association with birthrate is one indication of the population distribution. Newborn days, but not mother's maternity days, are excluded from the dependent variable utilization rates. Even though births are directly associated with hospital use, a high birth rate implies a young, usually healthy, population. Reproductive age women have short lengths of stay for maternity care and have low rates of admissions for other causes. Young children also have low rates of hospital utilization. Both factors would contribute to the negative association. Percent nonwhite and percent over 65, however, are strongly positive. Both of these groups report more illness and require more medical care.

The variable of most interest is the effect of HMO market share on hospital utilization. As in Chiswick's and Goldberg and Greenberg's studies, the variable is negative and almost significant with respect to total utilization. This indicates that the lower utilization of HMO enrollees is associated with a lower community utilization rate. However, when the variable on the utilization of non-HMO enrollees is tested, the sign is reversed. Unlike the results of Goldberg and Greenberg, who found HMO market share to lower the utilization of Blue Cross members, our equation finds a positive effect that nearly approaches significance.

A negative coefficient on the HMO variable in the non-HMO patient day equation would be interpreted as evidence of a cost-containing competitive effect through lowered hospital utilization of the general population. But how is a positive coefficient to be interpreted? Under what circumstances could a larger HMO market share lead to higher utilization among non-HMO enrollees?

It may be that HMO competitive effects are cost increasing. Physicians and hospitals may be responding to the growth in HMOs and the resulting loss of patients by admitting more discretionary cases and by prolonging length of stay with additional diagnostic tests. Following Joskow's argument, this reaction may be viewed as better quality care and may attract additional patients. If, however, patients and insurers are sensitive to the costs of care, this cannot be a long run solution.

Another explanation for higher utilization among non-HMO enrollees is that the lower utilization in the HMOs is not a true HMO effect but, rather, a result of selection. If health maintenance organizations attract

young, healthy enrollees or those who use less health care for their age and sex or health status, the lower HMO utilization is a consequence of low risk members in the HMO rather than the result of efficient HMO organization and financial incentives. Removing such low utilizers from the population leaves the remainder of the population with a higher average utilization.

What is the evidence that self selection occurs and that it has concentrated lower risk members in the health maintenance organizations? Theoretically, the coverage offered by HMOs should appeal to people who want comprehensive ambulatory coverage and those who want to budget for health expenditures. This is attractive to young families who may make frequent visits to outpatient clinics but are likely to use only relatively low cost hospitalizations for maternity care or infrequent trauma. Comprehensive coverage might also attract those who have chronic conditions, many of whom require frequent hospitalization. A review of the literature on HMO enrollment (Berki and Ashcraft, 1980) concluded that HMO enrollees are more often married with larger and younger families than those who enroll in a conventional service or indemnity health benefits plan. Prepaid health plans are also less likely to enroll people with a regular family physician; these are the same people who are likely to use more medical services.

An examination of the health status and measures of prior utilization characterisitics of HMO enrollees does not clearly support or reject the selection hypothesis. Some studies have found higher pre-enrollment hospitalization rates for HMO enrollees (Gaus, 1971; Roghman et al., 1975) and a higher incidence of bed disability days and chronic

(Richardson et al., 1976; Blumberg, 1980). In a study of Medicare beneficiaries who enrolled in HMOs, two of the three sites showed pre-enrollment inpatient rates that were significantly lower than those for a comparison group of the elderly (Eggers and Prihoda, 1982). An employer-based review of Blue Cross enrollees who switched from the service plan to a Blue Cross-sponsored HMO indicated that they were the enrollees with the lowest utilization (Halverson, 1981).

If HMOs attract lower utilizing enrollees, then the growth in HMO market share may lead to greater increases in the costs of medical care. Health insurance is designed to pool risk such that higher cost enrollees are implicitly subsidized by the lower cost enrollees. As a member and his or her family grow older, health status and utilization patterns change, and those formerly low utilizing enrollees will then be subsidized by the new lower cost members. This assumption is violated if the low utilizers leave a plan or if more high cost members join the same plan. In situations where people have a choice of an HMO and a conventional fee-for-service plan, concentration of low cost enrollees in the HMO will allow the prepaid plan to stabilize premiums while the service or indemnity plan will be forced to increase premiums if it is to maintain benefits for its high utilizing members. As the premium price rises, conventional plan members will make a calculation that compares expected utilization and expenditures to premium and out-of-pocket cost sharing requirements of the plan. Obviously, those who do not expect to recoup their costs will switch to another plan. This leaves an even higher cost group in the plan, and the cycle may continue until the remaining group is so expensive to insure that it is effectively "uninsurable."

Such effects have been documented in an increasing number of multiple choice health benefits plans. High option Blue Cross enrollees in the Federal Employees' Health Benefits Program are much more likely to use services than those in the low option plan. In fact, the low option plan appears to be selected by the young, single employees and by older employees who qualify to use it as supplemental coverage to Medicare (Gold, 1982). The health benefits program for California state employees shows a concentration of high cost annuitants and retirees in the fee-for-service plan while the health maintenance organizations, with their lower premiums, attract the younger populations (Luft, Maerki, and Trauner, 1983).

It should be recognized that even if self-selection did not occur within employee groups offered HMO coverage, our attempt to "net out" non-HMO use could spuriously result in the appearance of such an effect. HMOs typically have a below average proportion of Medicare and Medicaid enrollees and, obviously, none of the uninsured. If these three groups are above average users of hospital care, then one would expect use by non-HMO members, including these people, to be higher than the average for the whole population including HMO members. The coefficients for PCTNWHT and OVR65PCT capture much of this effect, and most importantly, they change very little between the two equations. This suggests but does not prove that the sign change on the HMO coefficient is not purely an artifact.

Although our findings are reasonably robust with respect to alternative specifications, several caveats must be issued before drawing policy implications. While we attempted to control for the proportion of the elderly and poor in each area, there might be other subgroups whose influence is magnified by our technique of estimating use by non-HMO

members. One can never completely rule out the potential impact of data errors or other such random events. More importantly, it may be the case that cost-containing competitive responses to HMO growth occur in areas other than hospital days per capita, although the dominant role hospital costs play suggests that some effect should be seen. We wanted to repeat the analysis for admission rates, but admissions are not reported for all HMOs.

One may argue that cost-containing responses take time to have an impact, so our contrary results are merely short run aberrations. Our use of 1975-76 data, focusing on mature HMOs, was intended to minimize this problem, but perhaps the lags are even longer than we anticipated. Theory and rhetoric, however, offer little insight into when one makes the distinction between short and long run phenomena. We choose to interpret our results cautiously and not claim evidence for utilization increasing responses to HMOs. However, our empirical estimates suggest that there is either no evidence of a cost saving response or, if such a response exists, it may take so long as to be irrelevant from the perspective of decisionmakers in need of short term policies to contain medical care costs.

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by an employer for the payment of health insurance premiums and not to be taxed as income to the employee. While there are many reasons such a change might or might not be desirable, the change may have substantial implications for HMO growth.

Not only does the federal government influence the rules of the health insurance market, but it is the largest single purchaser of coverage and services through the Medicare program. Until recently, Medicare regulations had made contracts unattractive from the perspective of the HMOs, but new legislation provides substantially more flexibility and may result in much greater willingness by HMOs to seek Medicare enrollees. If most of the apparent cost difference between HMOs and conventional plans is due to efficiencies and more cost effective practice styles by the HMO physicians, then HCFA could reap substantial savings, and Medicare enrollees in HMOs would experience lower costs or enhanced benefits. On the other hand, if selection of low utilizing people into HMOs accounts for most of the cost difference, then HCFA would, at best, be no worse off contracting with HMOs and, at worst, expenditures could increase. Medicare contracts could also have a major impact on the HMO industry by opening up an important new market area. If HMO growth has a spill-over effect on local conventional providers, then increased Medicare contracting could have even more substantial systemwide effects.

Some state Medicaid programs have had HMO contracts for over a decade, but such contracts have had only a minor role in the overall system. Recent federal legislation (Section 2175 of the Omnibus Budget Reconciliation Act of 1981, PL 97-35) allowing more flexibility in

contracting with HMOs as well as the current fiscal crisis at the federal and state level has led to renewed interest in HMOs (Bartlett, 1982). Simultaneously, some states, such as California and Minnesota, have passed legislation encouraging the development of HMOs and similar alternatives to the conventional open-ended fee-for-service reimbursement system. As the intent of these current and proposed policy changes is cost containment, it may be useful to examine the research-based evidence concerning the potential for real savings.

Selection Effects

There are two primary ways of examining the importance of selection in explaining the observed cost differences between HMOs and conventional plans. The first approach uses a quasi-experimental research design and examines the utilization of people who switch from conventional to HMO plans, using as controls those people who chose to remain in the conventional plan. If those who joined the HMO had significantly different use rates prior to changing plans, selection is said to take place. The second approach uses multiple regression techniques to "hold constant statistically" various factors that may influence utilization and then estimates what the cost or utilization of people in HMOs would have been had they been in the conventional system. Differences in actual and predicted utilization would be interpreted as due to selection. While there are several important methodological differences between these two approaches, the crucial points are sufficiently clear so that a detailed discussion is not necessary.

At an early point in this project, data were collected from two quasi-experimental situations--the Seattle Prepaid Health Care Project (Richardson et al., 1977) and the growth of HMOs in Rochester, N.Y. (Roghmann, Sorenson, and Wells, 1977, 1980). The results of the two settings were consistent in showing lower hospital use while under fee-for-service by those who later joined the prepaid group practices. The Rochester data also suggest above average use by people who joined a broadly based independent practice association type HMO. These findings are consistent with theoretical analyses of choice of plan and survey responses concerning plan preference. In brief, one of the primary factors affecting the decision to join a prepaid group practice (PGP) is the presence of a strong prior relationship with physicians in the fee-for-service community (Berki and Ashcraft, 1980). Aside from people who have recently located in the area, those without a usual physician tend to use fewer services. Thus, when a PGP is newly made available to a group of people with conventional insurance, those most likely to join tend to be lower than average users of medical care.

While subsequently these findings were replicated with evidence from Medicare beneficiaries in various settings (Eggers, 1980; Eggers and Prihoda, 1982) as well as from the Minneapolis-St. Paul area (Jackson-Beeck and Kleinman, 1983), one should not attribute too much to the selection effect. The technique of evaluating use before and after enrollment is likely to result in a maximum estimate of the selection effect for several reasons. Some people, knowing they will change coverage soon, may postpone use until their enrollment is effective. Given the generally more

comprehensive benefits of HMOs, this may be particularly the case for certain discretionary services. More importantly, while year-to-year utilization is correlated, it is far from a perfect predictor; most medical care, especially hospital use, is unpredictable given generally available data. In most populations, hospital use is generally attributable to about 10-15 percent of the people. Given the trauma, both psychological and physicial, many people who have recently been hospitalized will be unwilling to change providers in the following year, just in case further problems should arise. This relatively short-run phenomenon may account for a substantial part of the observed selection differences from these studies. A further analysis of the Seattle data supports this notion. Whereas people joining the PGP had substantially fewer hospital admissions prior to enrollment than did those joining the Blue Cross plan, and this difference was very evident in the first years of the study, over time use by the the HMO members rose and use by the Blue Cross members fell. By the third and fourth years of the enrollment study, HMO admission rates exceeded those of the Blue Cross enrollees (Diehr et al., 1976).

Analyses of cross sections of enrollees in PGPs and conventional plans also indicate no substantial differences in health status or, if anything, slightly more reported chronic illness among the PGP members (Blumberg, 1980; Hetherington, Hopkins, and Romer, 1975). These studies suggest that even if selection effects are substantial for new enrollees, they may have little impact on the overall use of the entire membership--much as a slow trickle of hot water does little to warm a bathtub full of cold water. Furthermore, these studies also suggest that even the observed

utilization differences attributable to selection may result not from differences in underlying health status or need, but in differences in the likelihood of a person's seeking medical attention for a given problem.

Competitive Effects of HMOs

Much has been said and written about increasing competition in medical care. The argument is often made that the workings of the competitive market result in greater efficiency and lower costs to the consumer. This argument rests both on generally accepted economic theory and on extensive empirical research in other markets. However, since medical care often appears to be different from most commodities, it is worthwhile to ask whether there is solid evidence suppporting the notion that increased competition leads to lower costs than would otherwise be expected. It is important to note here that we are focusing on the presence of cost-containing competitive outcomes, not just the sound and fury of a competitive process. We are also asking whether costs are lower than would otherwise be expected. This imples that costs could continue to increase, but at a slower rate. It also implies that attention should be paid to other changes in the local medical care system to determine "what would otherwise be expected." Since the focus of this project is on the competitive effects of HMOs, other types of competition, such as free-standing surgery centers, or other interventions, such as Professional Standards Review Organizations, must be taken into account separately.

The three case study areas were chosen precisely because HMOs were alleged to have had substantial competitve effects in those areas. Thus,

it is not surprising that many people in the area spoke and wrote about the competitive process underway. While these process indicators were particularly evident in Hawaii and Minneapolis-St. Paul, they were also discussed in Rochester, and, in fact, recommendations were made in Rochester for an HMO subsidy because of its alleged salutary effect on utilization by Blue Cross members. However, in none of the three areas was there clear evidence of cost-containing competitive outcomes.

Competition between Kaiser and the local Blue Shield plan (HMSA) in Hawaii had been going on for about one quarter century, sufficient time for the observation of lagged effects. The hospital utilization rate in Hawaii is low and continues to fall, but the declining trend began before Kaiser's entry. Furthermore, Hawaii has witnessed massive changes in average length of stay--both increases and decreases--that seem to be amplified reactions to national trends and are relatively uninfluenced by the competition between Kaiser and HMSA. In the last decade major reductions in hospital use have occurred for public beneficiaries for whom HMSA is an intermediary, yet the reductions have been much smaller for its own enrollees. This is precisely the opposite pattern from what would be expected from a cost containing competitive effect.

Hospital utilization of Blue Cross members in Rochester does appear to be falling, although the rate of decline is probably exaggerated because of data errors and falling enrollment. Given the dominant Blue Cross market share in the area, it is surprising that at the same time overall hospital use per capita is increasing. While this may be evidence of a cost-<u>increasing</u> competitive response as providers compensate for the loss

patients to HMOs by treating their remaining patients more intensively, it is more likely due to other factors. A prime suspect in "the mystery of the rising utilization rate in Rochester" is an unanticipated outcome of state constraints on nursing home reimbursements. As a cost-containment approach, New York tightened Medicaid reimbursement rates for nursing homes, and this seems to have made them less willing to accept elderly patients from acute hospitals. The "back up" of such patients awaiting transfer, combined with a tight bed supply in Rochester, may have resulted in downward pressure on hospital use by the younger Blue Cross population.

The Minneapolis-St. Paul situation is the least clear for several reasons. First, the development of major HMO competition there has occurred primarily in the last few years. (Group Health Plan has had substantial HMO enrollment dating back to the 1950s, but few observers credit it with having a major competitive influence before the mid 1970's. Second, the observable changes in hospital utilization rates are small relative to inconsistencies in the underlying data sets. Third, and most importantly, other changes have been occurring in the local medical care market that are at least equally plausible as explanatory factors. These include the growth of hospital chains and shared service arrangements, the suburbanization of the population, major utilization review efforts by the local PSRO, and the growth of ambulatory surgical centers.

The cross-sectional analysis of SMSA data also provides little evidence of a cost-containing competitive effect. While the regressions indicate a negative, albeit insignificant, correlation between HMO market share and hospital use by everyone in the area--a result consistent with

Goldberg and Greenberg's (1980) findings, we found a weak positive relation with hospital use by non-HMO members. As indicated above, this could be due to a self-selection effect, a cost-increasing competitive effect or a combination of these with a very weak cost-containing effect.

Implications for Policies Concerning HMOs

These findings have implications affecting two broad areas of policies concerning HMOs. The first are policies to encourage the development and use of HMOs because of the cost savings attributable to the new HMO enrollees. The second are policies to encourage competition between HMOs and conventional insurers and providers in order to achieve systemwide savings.

Given the policy relevance of the potential cost containing aspects of HMOs, special attention was paid during the project to how the results might be used. Unlike basic research, research with potentially important policy implications is likely to be used as part of an adversarial debate. The people involved in such debates are usually not expert in research methods and often ignore fine details and subtle caveats. If a study suffers from certain important weaknesses, one can hope that subsequent research will eventually contradict it, but with the rapidly moving health care policy environment, such rebuttals may occur too late to prevent an incorrect decision based on weak research.

In an ideal world in which research findings are being brought to bear on policy decisions, each side in the debate should have experts capable of critiquing and analyzing the evidence supporting each point of view. (Policymaking, of course, usually depends on research findings only

to a small degree, although research often serves to focus attention on certain key issues. One may also hope that improving the quality of policy-oriented research would lead to an increase in the demand for such work.) While such a process is not yet available, we approached this project with the notion that all evidence either supporting or rejecting the hypotheses would be presented. If the balance of the evidence were strongly in favor of one view, then we would be lucky in having a clear set of conclusions. Instead, we found evidence on both sides of the issue and a hung jury rather than a clear verdict. While this supports the usual call for further research, we feel that the evidence--on both sides of the issue--does support some important policy implications.

Cost Savings for HMO Enrollees

The relatively fragmentary evidence from this project, as well as a growing body of evidence from other researchers, suggests that there is, in some circumstances, a selection effect among new enrollees that favors prepaid group practices. The selection effect may go in the other direction for open-panel independent practice association type HMOs. That is, the strong role of existing doctor-patient relationships may lead relatively low utilizers into PGPs and relatively high utilizers into IPAs. First, there is some evidence and substantial theory that the type and importance of selection varies with the relative benefits and net enrollee premium cost for the various options. The relationships among HMO and conventional coverages and premiums, as well as employer contributions have changed markedly in recent years, and any future decisions should take into

account those changes. Second, the selection effect measured among new enrollees is likely to be substantially above the effects of selection for long-term enrollees, and for a large HMO with relatively small enrollment growth selection may have an insignificant effect.

The recognition of the potential presence of a selection effect results in several policy implications. The first is that the observed difference in cost for enrollees in HMO and in conventional plans probably overstates the true system savings. While the magnitude of the overstatement is unknown--and probably depends on the specific situation--the selection effect is likely to be greatest during the first years of multiple choice. Thus, while increased HMO enrollment may result in system cost savings in the long run, the short-term effects may be lower costs for HMO members and higher than anticipated costs for those remaining in the conventional plan. At a minimum the policy analysts should anticipate such an outcome and be prepared for the political repercussions.

Financing systems with adjustments for potential self-selection should be developed. For example, capitation rates should not be based on an unadjusted fee-for-service average, but should be fine-tuned to compensate for differences in enrollment mix. The Health Care Financing Administration has recognized this problems in the case of Medicare contracts with HMOs and is attempting to go beyond age, sex, region, and coverage status in developing an adjusted rate. Similar types of adjustments may well be appropriate for private groups offering HMO options. While this is the appropriate approach conceptually, the level of detail necessary may strain the capacity of the Medicare system, let alone much smaller employee groups.

The notion that risk factors may vary substantially among enrollees in various plans suggests that the premiums paid for each category of enrollee should also vary. Otherwise, plans attracting low-cost enrollees will reap windfall gains and those attractive to high utilizers will either go bankrupt or will develop methods of excluding the sickest. Premiums scaled according to risk would neutralize the incentives from the plan's perspective to skim low cost enrollees. However, this leaves open the question of whether the enrollee's share of the premium should be fixed in percentage or dollar terms, or whether the enrollee be forced to bear the full cost of the additional premium? One's answer will depend upon both equity and efficiency considerations and upon the extent to which one attributes higher risk factors to variables under the individual's control. For example, if most of the increased risk were attributable to cigaret smoking, the argument for offsetting public or employer contributions might be weaker than if the risks were associated with genetic predispositions.

System Savings through Competition

The results of both our cross section and in-depth studies provide little support for the notion that competition between HMOs and conventional insurers and providers results in lower systemwide costs. While these findings are contrary to some earlier studies, they also demonstrate how a more cursory view of the same evidence might support the cost-containing hypothesis.

Negative results such as these are more difficult to interpret than clear, positive findings. There may, in fact, be a cost-containing competitive effect which we failed to see because we looked at the wrong variables or examined the wrong markets. Alternatively, such an effect may be either too small to be observed with our rather crude measures, or it may still be in the process of unfolding. While other researchers may have chosen different techniques, our use of both cross sectional data and in-depth case studies in the three areas was intended to find a cost containing effect if one existed. The research process, methods, and underlying data are presented in more than the usual detail as an invitation to others to question and reinterpret the findings. Certainly, pieces of evidence in each of the studies can be found that are consistent with selected hypotheses, but the gestalt is one of no clear cost-containing impact.

One may argue that some of the evidence indicates a favorable competitive response and this, in combination with analogies from other market areas, should be persuasive. (However, the appropriateness of the analogy may be questioned, and one could put forth counter arguments that, at least in the short run, competition might be cost-increasing.) The important weakness in this argument from a policy perspective is that competition as a cost containment strategy may be desirable only if it results in cost savings within a relatively short period of time. Even if statistically significant cost savings were found, they would be irrelevant if they were not to make a noticeable difference in overall costs within the next few years.

These findings indicate that if policy makers were interested in slowing either the overall growth in medical care expenditures or in government costs for medical care, encouraging competition is unlikely to produce significant results within a reasonable time horizon. The long-term impact, say, over a decade, might be substantial, but there is no evidence for this. Encouraging competition in medical care may serve to advance other purposes, but an evaluation of its effectiveness in achieving such goals must await another study.

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